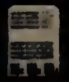
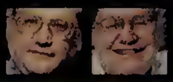


PBX REPLACEMENT PLAN Nortel's Accelar Layer 3 routing switch key to firm's IP voice platform. Page 8.



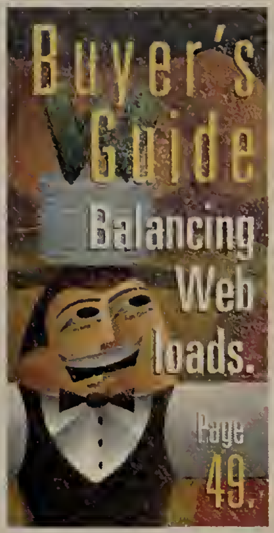
MORE THAN CLUSTERING Start-up Times N's founders building a new multiprocessing system. Page 12.

The newsweekly of enterprise network computing

NetworkWorld

June 14, 1999 Volume 16, Number 24

The network portal: www.nwfusion.com


Buyer's Guide
Balancing Web loads.
Page 49.

CHEWING THE VPN FAT

Over dinner together, CEOs of four virtual private network start-ups scheme how to become the next Ciscos.

BY TIM GREENE

We recently invited the CEOs of four VPN start-ups to a refined little restaurant called Drais located deep beneath the casino floor of the Barbary Coast hotel in Las Vegas.

Our mission? Ply them with fine food and wine, let them unwind from a hectic day and engage them in a down-and-dirty discussion about where virtual private networks are headed. As we found out, these executives were among the highest rollers in Vegas that week, gambling millions in start-up money to become the next network giant among the likes of Cisco and Nortel Networks.

Joining us were Kenny Frerichs of Network Alchemy, Tom Steding of RedCreek, Per Suneby of Indus River and Tim Hember of Newbridge affiliate TimeStep. Settling in after cocktails, Suneby indulged in the possibilities

See **VPN,** page 72

"We could all unite against the big guys."

Kenny Frerichs,
CEO of Network Alchemy

"We could spend the rest of the night writing an [agreement] and merge these four companies."

Tom Steding,
CEO of RedCreek

"I don't see why [merging with each other] would make you more viable."

Per Suneby,
CEO of Indus River

"Doubling the size of two architectures that are very similar won't do it."

Tim Hember,
CEO of TimeStep

DAVID WAITE

Little IBM chip fuels faster gear

BY MARC SONGINI

IBM's Network Hardware Division is developing a network chip that Big Blue hopes will power a fast, flexible new generation of IBM and third-party switches and boost the division's flagging fortunes.

Code-named Rainier, the network chip will increase network throughput by at least 30% in devices it is built in to, IBM executives claim. The chip, which is about the size of a stamp, will support Layer 2, 3, 4 and 5 switching and routing and will permit wire-speed links among Ethernet, ATM and SONET networks.

Ultimately, products using the chip will let users more easily build networks capable of guaranteeing quality-of-service (QoS) levels at high

See **Rainier**, page 16

Newspaper $5.00

DSL: Can't we all get along?

DSL-Lite spec does not ensure interoperability.

BY TIM GREENE

ATLANTA — More than 30 digital subscriber line (DSL) modem companies last week demonstrated compatibility among their products. But that doesn't mean you can buy the modems and expect them to work with everyone else's — yet.

The modems on display at last week's SuperComm '99 show in Atlanta met all the basic specifications outlined by the pending standard for DSL-Lite. That DSL flavor is seen by many as the best hope for widespread DSL deployment and as a top challenger to cable modems.

But because of variations in how vendors implemented the specifications, the modems could talk to some of the other modems in the demo, but not to all of them.

Modem makers and service providers at SuperComm say they are still on track to deliver DSL-Lite services and interoperable equipment late this year or early next year. But vendors and providers also acknowledge that they have to do more to show that the

See **DSL**, page 14

More Online

- A listing of which vendors' gear interoperates.
- More on DSL compatibility woes.

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BellSouth faces long, tough journey to Qwest

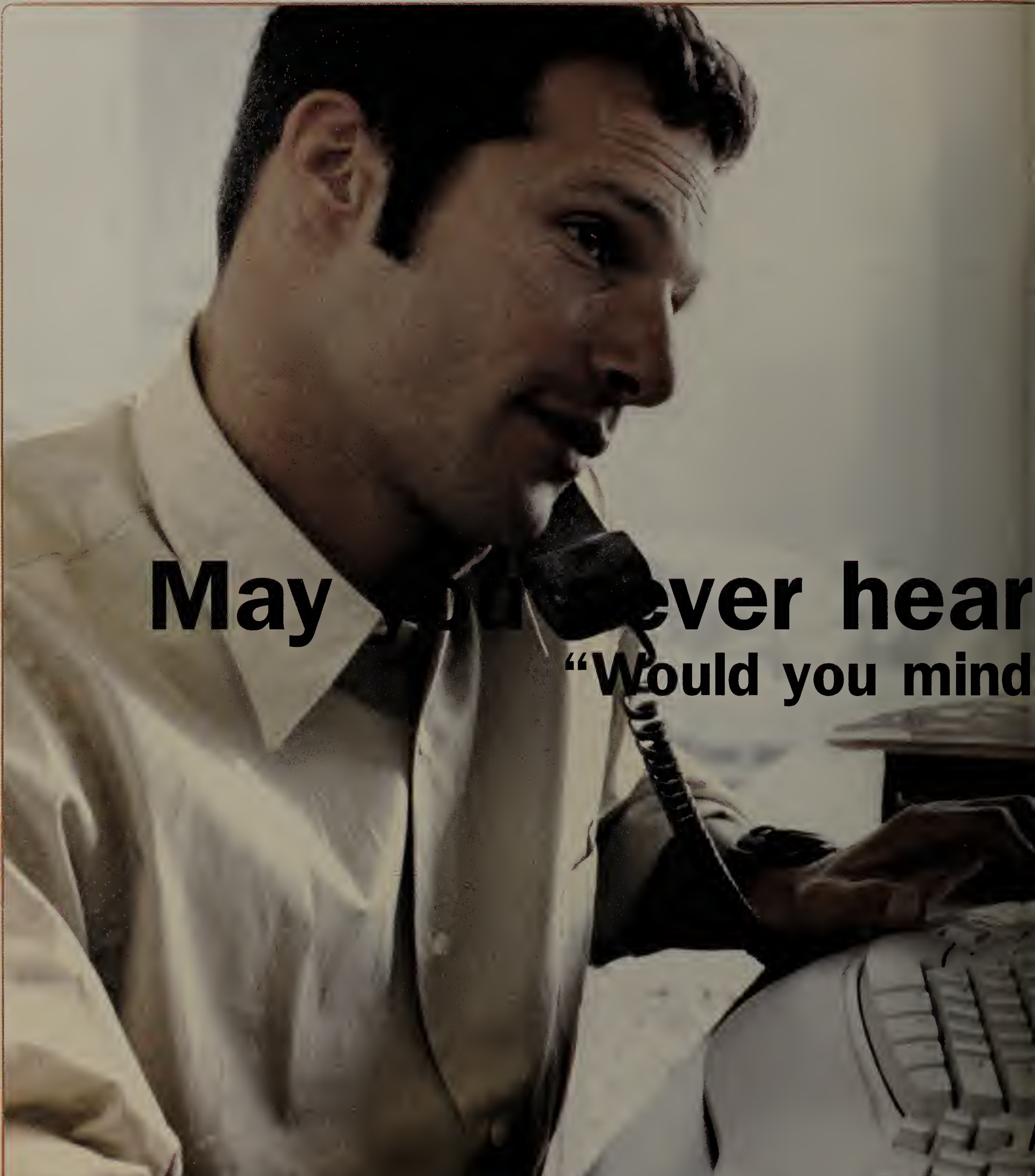
BY DAVID ROHDE

WASHINGTON, D.C. — BellSouth last week revealed in a government filing that it is in merger talks with long-distance starlet Qwest Communications.

But the filing indicates that any potential merger may require arduous negotiations — and that a combination of the two companies might not result in any immediate benefits to users.

In a Securities and Exchange Commission filing, BellSouth said it is talking to Qwest executives about a

See **Qwest**, page 70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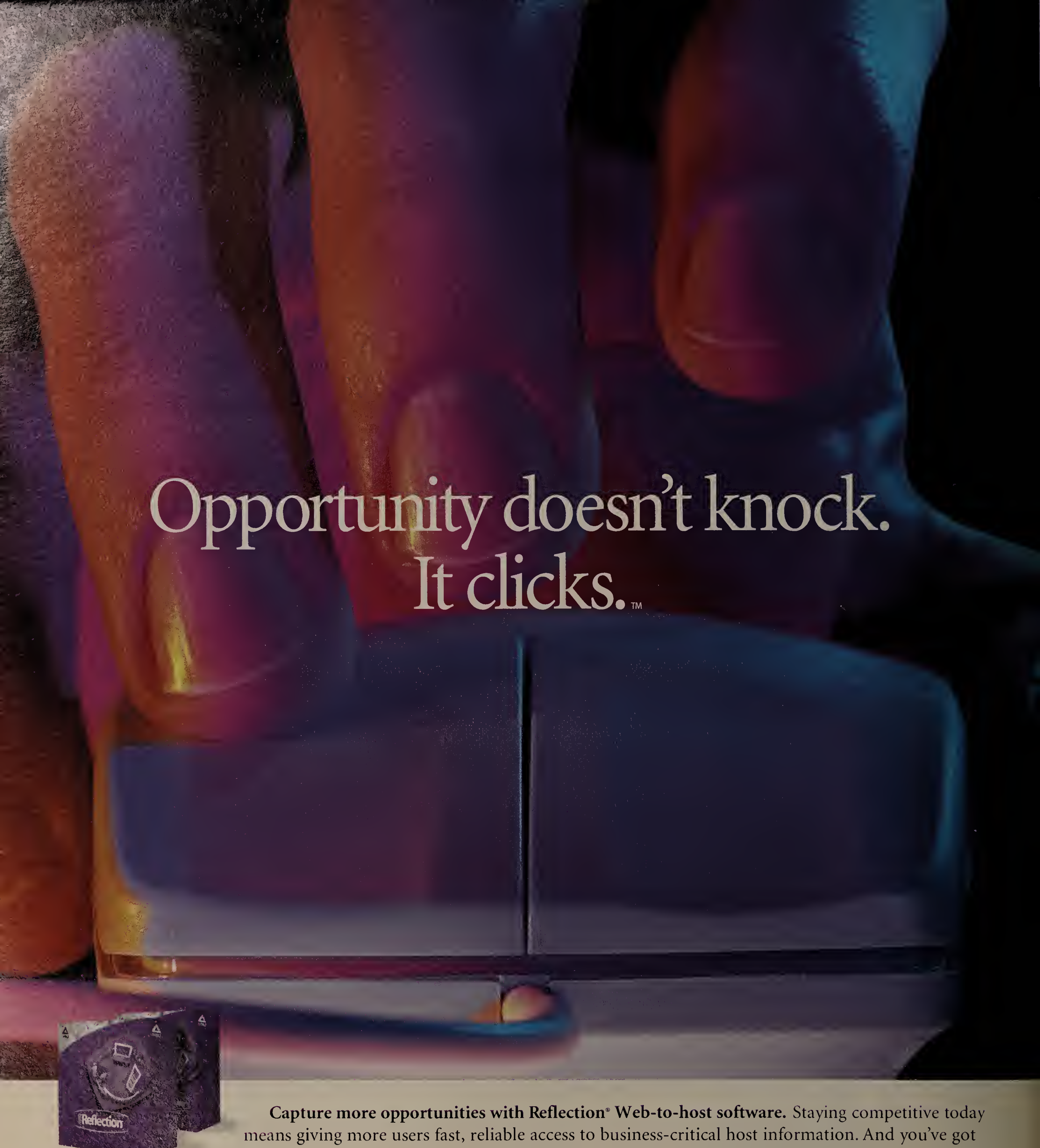

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THIS WEEK ONLINE

Water Cooler. A few weeks ago, *Network World* News Editor Bob Brown asked network administrators if they cared about all the new carrier and ISP equipment coming onto the market. Overwhelmingly, they said, "No." "I suppose if I were stuck in the dentist's office, with nothing else to read, I might give a story about carrier equipment a quick glance," wrote one IS professional. Still, there are some advances on the carrier front you should care about, Brown says. See what they are. **DocFinder: 3339**

Wireless billing. The FCC last week voted to begin looking at a new cellular billing system under which the calling party would pay for the call. Fusion users split on the issue — some say it's about time for the U.S. to catch up with the rest of the world; others explain why they don't mind paying for incoming calls. What do you say? **DocFinder: 3343**

Nonprofit networking. Do you work for a nonprofit group? If so, join our discussion about the unique challenges you face in building and running a network. **DocFinder: 3341**

Directories. Last week, we posed the question: What could users of Microsoft's yet-to-be-released Active Directory learn from their counterparts who already use NDS? See what folks on both sides of this directory divide had to say online and add your own thoughts. **DocFinder: 3342**

12/31/99. At the stroke of midnight, as 2000 begins, where will you and your staff be: Sitting in front of your consoles waiting for things to blow up or at a party with lots of noisemakers? Tell us in our new forum. **DocFinder: 3340**

How to get onto Network World Fusion

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

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WRITE: Network World, 161 Worcester Road, Framingham, MA 01701; CALL: (508) 875-6400;
FAX: (508) 820-3467; E-MAIL: nwnews@nww.com;
CIRCULATION: CALL: (508) 820-7444;
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- Product specifications from 16 vendors.
- Vendor responses to our load-balancing RFP.
- Advice from load-balancing adopters.

WIDEBAND WORKS:

NEWS BRIEFS, JUNE 14, 1999

Attack of the killer worms

More destructive, but apparently not as widespread as Melissa, another e-mail-borne menace had network administrators reaching for the industrial-strength pesticides last week.

This latest worm, dubbed Worm. ExploreZip or TROJ_EXPLOREZIP, reportedly only affects Windows machines running MAPI e-mail clients, such as Microsoft Outlook. Whereas Melissa was relatively benign, however, this worm copies itself to system directories as explore.exe — so it runs on every reboot — and scans the hard drive, destroying Microsoft Word, Excel and PowerPoint files, as well as C programs. Although the full extent of the outbreak was unclear late last week, Microsoft, Intel, Symantec, NBC and General Electric were among the companies reportedly hit. Needless to say, the antivirus vendors were in full wail as they sounded the alarm . . . and pitched their wares.

More execs flee Cabletron

Two executives have left Cabletron in the wake of CEO Craig Benson's resignation two weeks. John d'Auguste, Cabletron's president of operations, and Allen Finch, vice president of marketing, resigned last week amid speculation that the beleaguered Cabletron is the target of a takeover or management buyout, according to published reports. Cabletron did not comment by press time.

That was the week in wireless

- The Federal Communications Commission last week proposed an optional nationwide calling party pays (CPP) system for wireless calls. Under the scheme, cellular, personal communications services and paging carriers could offer their subscribers CPP plans so callers, instead of subscribers, would pay for the call. But carriers would have to provide notification to each calling party that the call was on their nickel at specified rates, with the opportunity to drop the call without charge.
- The FCC also tentatively proposed a requirement that private commercial building owners open rooftop and other access to all local carriers. However, the agency acknowledged that the proposal raises "constitutional and statutory authority issues," and requested comment. The Building Owners and Managers Association has warned the FCC to stick to regulating carriers — not private property owners — and threatened a congressional fight. But wireless local-loop carriers such as WinStar and Teligent have begged the FCC for just such a rule, claiming that many commercial building owners have exclusive sweetheart deals with regional Bell operating companies. An FCC final rule on either matter is unlikely until next year.
- Motorola and Sun last week signed a nonexclusive 10-year technology agreement to develop wireless IP technology. The companies will work together to deliver IP network servers, base stations and base-station controllers for wireless networks.

IBM Whistles a new 'Net tune

IBM last week said it would snap up Internet services company Whistle Communications to better provide small organizations with Internet and e-mail services. IBM plans to aim Whistle's InterJet thin-server product, as well as a number of IBM tools, services and financing options, at companies with less than 100 employees. IBM and Whistle did not release financial terms of the acquisition, and Whistle will retain its own identity within IBM.

Ex-Compaq troika rolls onto the 'Net

A trio of Compaq expatriates — Gary Stimac, Doug Pushard and Mike Swavely — emerged from self-imposed exile last week to introduce their entrant in the Internet sweepstakes.

OfficeDomain, Inc. is pitching a Web-based unified messaging portal to mobile professionals and small office/home office workers.

Users of the service, Message ASAP, can access their e-mail, voice and fax messages in a single in-box over the Web or by telephone.

CEO Pushard says OfficeDomain's portal will help mobile users communicate.

Message ASAP sprung the personal frustrations experienced by Murray Freeman, company co-founder and chief technology officer, says Pushard, OfficeDomain's CEO and president.

"He was a consultant who traveled around the world and found himself paying a couple thousand dollars a month in telecommunications costs, having a secretary and still not being able to get his messages," Pushard says. "He actually built a product for himself," which has evolved into the company's new service.

Jumbo Frames gather support

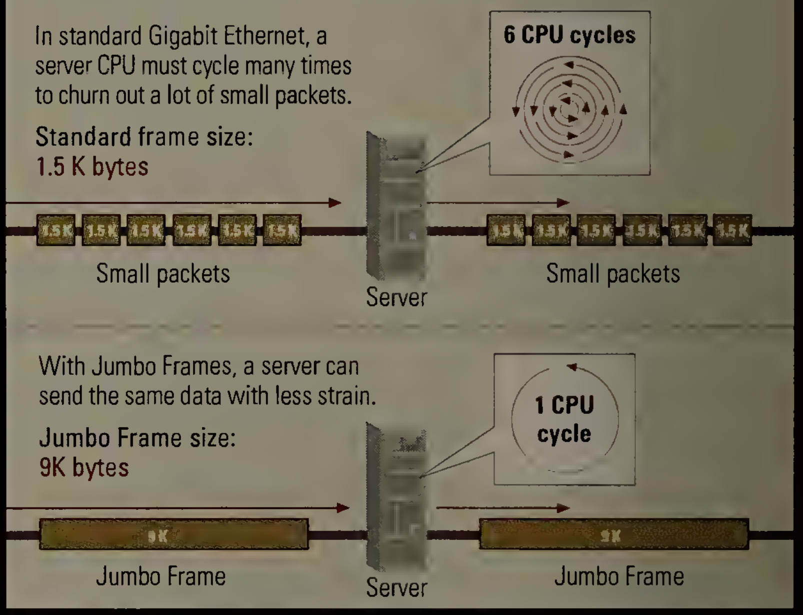
BY JEFF CARUSO

Momentum continues to build for Jumbo Frames, as a standards body and vendors begin to endorse this nonstandard technique for transferring large amounts of data over Gigabit Ethernet.

The Internet Engineering Task Force (IETF) has published a working document proposing that Ethernet frames be extended beyond the standard 1.5K-byte limit. The document also specifies a way to designate that the frame is large in an Ethernet frame header.

Easing the burden on servers

With a single Jumbo Frame, it takes less time for servers to process than it does with several smaller frames.



In standard Gigabit Ethernet, a server CPU must cycle many times to churn out a lot of small packets.

Standard frame size: 1.5 K bytes

With Jumbo Frames, a server can send the same data with less strain.

Jumbo Frame size: 9K bytes

The two biggest vendors of network interface cards (NIC) are also lending support to Jumbo Frames. Intel has released a software driver for its Gigabit Ethernet card that lets users adjust the maximum frame size allowed. A frame could be as small as 4K bytes or as large as 16K bytes. Separately, 3Com plans to implement Jumbo Frames on its Gigabit Ethernet cards in the third quarter.

Intel and 3Com join a handful of other vendors, including FORE Systems, IBM, Microsoft and Silicon Graphics, that have already declared their support for Jumbo Frames.

Jumbo Frames — with a maximum size of 9K bytes — were created by Alteon WebSystems to address a problem that occurs with servers attached to a Gigabit Ethernet net. Every time a frame arrives at a server, an interrupt is generated, meaning the server's processor has to divert attention to the incoming frame. At gigabit speeds, the interrupts come fast and furious.

"Even with Pentium III's, servers can talk at wire-speed Gigabit Ethernet or they can do useful work — but it's hard to do both," says David Passmore, research director of Net Reference. Larger frame sizes mean fewer headers to process for any given period of time, freeing up a server processor for other tasks. However, no independent testing has been done yet to quantify the benefits of Jumbo Frames.

Although 3Com and Intel are supporting Jumbo Frames in their NICs, the companies see the technology as an interim measure before servers become able to handle Gigabit Ethernet.

The vendors point out that Microsoft's Windows 2000, for instance, will be able to pass large frames to a NIC, which can cut them into standard-size frames and send them over a network. ◪

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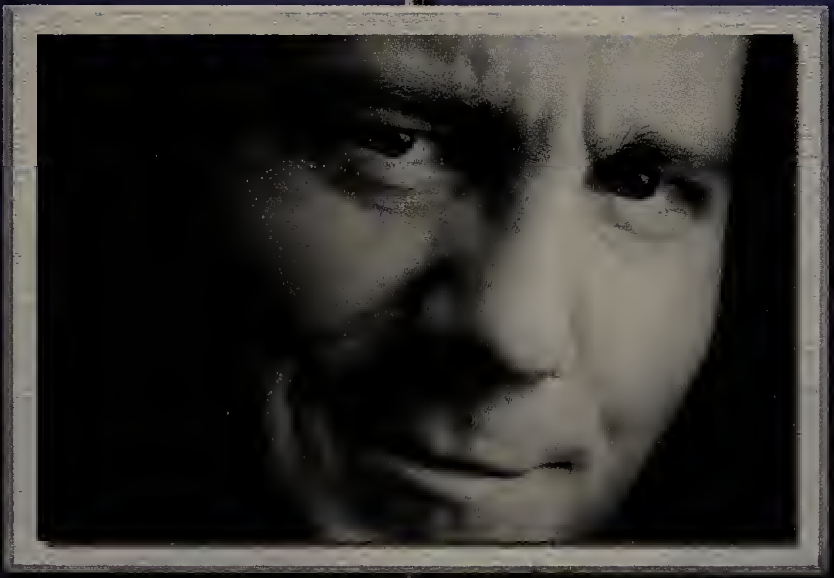

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THE MICROSOFT REPORT

Microsoft crisscrossed the technology landscape last week like a drunken sailor, stopping to hoist pints in a variety of industry establishments, including telecom, messaging, desktop computing and mobile devices.

Meanwhile, the company's lawyers in Washington, D.C., and Bridgeport, Conn., faced the sobering proceedings of antitrust litigation.

President Ballmer tackles telcos.

First stop for the software giant was the SuperComm '99 tradeshow in Atlanta. The bottom-line message from Microsoft President Steve Ballmer during his keynote was that software may be Microsoft's everyday drink, but telecommunications will become the jewel of its wine cellar. Although Microsoft won't join the telecommunications rat race as a service provider, it intends to supply as many chunks of cheese as possible, he said. And as if scripted (wink, wink), Hewlett-Packard and Nortel Networks announced systems based on Windows NT that converge voice and data (see story, this page). HP and Microsoft said they would deliver 99.999% uptime. Sun officials snickered before announcing their own convergence platform — on Solaris. The Redmond revelers also said that a group of telecommunications vendors, including FORE Systems, had formed a working group to create and promote application interfaces based on Microsoft's Component Object Model. After Sun snickered again, it announced its own initiatives — based on Java.

Watson, my e-mail is down

Ballmer raised the voice theme again at SuperComm, this time saying the next version of Exchange Server, code-named Platinum, would focus on unified messaging. Although the concept of unified messaging has been around longer than trade show promises, it has failed to resonate. Microsoft will beat the drum using Platinum's Web Store to house voice and data messages and a new Super Long Value database format to offer streaming of large voice data files. Platinum also will support the Voice Profile for Internet Mail standard for unifying disparate voice mail systems.

A tip of the cap to IT

For those stuck in the boring world of data, Microsoft last week shipped Office 2000. Although the company touted its new collaboration features, the suite actually includes a host of slick tools that cut deployment and management costs. The suite's Custom Installation Wizard controls configurations and installations, and the Office 2000 Language Pack "plug-ins" mean only a single code base needs to be deployed in an enterprise. The suite's applications also have a self-repairing feature. Now if it could only make the morning coffee.

Size doesn't matter but timing is everything

In Denver, Microsoft must have gotten a little lightheaded in the thin air, because it announced a product at its CE Developers' Conference that won't even be in beta until early next year (if computing survives the millennium, that is). SQL Server for Windows CE is based on a subset of SQL Server APIs designed to provide a consistent set of tools to developers regardless of platform or form factor.

Can we be friends?

When Borland was Borland, Microsoft was an enemy. But since Borland is now Inprise Corp., the relationship is on the mend. Microsoft bought $25 million of Inprise stock last week, and the two announced a wide-ranging partnership, including Inprise licensing Microsoft Foundation Classes for Inprise's C++ Builder. Microsoft also paid Inprise $100 million for some patented technology and to bandage a number of festering licensing issues between the two. Ooo, that feels much better.

Office 2000 is big, but easy to install.

All rise

It got ugly last week during the government's antitrust case against Microsoft when IBM executive Garry Norris took the stand. Norris, who negotiated IBM's Windows licensing agreements for its PC line, said Microsoft threatened to retaliate against PC makers that offered IBM's OS/2 and other applications, most notably Netscape's browser and Lotus' SmartSuite. Microsoft tried to discredit Norris on cross-examination but quickly drew the ire of Judge Thomas Penfield Jackson. And in Bridgeport, in an antitrust case brought by Bristol Technologies, expert witness Richard Langlois, a University of Connecticut economics professor, testified that Microsoft did build a monopoly in the workstation and server market with the help of a source-code licensing agreement with Bristol before terminating that license. Microsoft calls it a mere contract dispute.

— John Fontana

Nortel launches 'Inca' PBX

Company puts muscle behind IP telephony.

BY DAVID ROHDE

NEW YORK — As users mull whether to take the IP voice plunge or sit still with circuit-switched voice nets, last week another voice heavyweight jumped into the enterprise IP telephony fray.

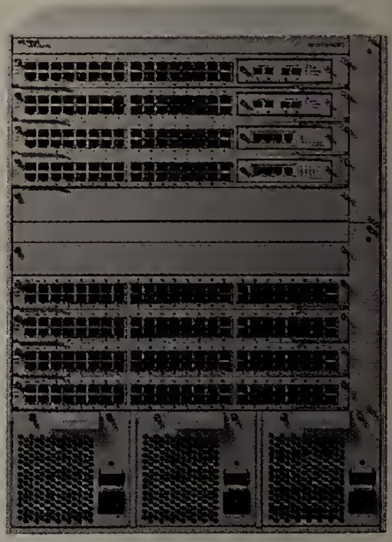
This time the vendor is Nortel Networks, which brings to the table the market-leading Layer 3 routing switch for data nets — the Accelar series. The core of Nortel's strategy is to use the Accelar — one of the fruits of Nortel's acquisition of Bay Networks — as the switching core of its new IP voice boxes. The boxes will become PBX replacements that can handle a unified voice/data campus net.

But to cover its installed base, Nortel's IP telephony roadmap also includes some more-conservative product plans to add outbound IP trunking options and Ethernet phones to existing Nortel PBX systems. Reflecting Nortel's desire to serve users unwilling to throw away their PBXs as well as those willing to move quickly to converged networks, Nortel's IP telephony roadmap includes a whopping 11 products — two more than Lucent unveiled several weeks ago (*NW*, May 3, page 12).

Perhaps the most important piece of Nortel's roadmap won't even go into alpha test until the fourth quarter of 1999, with availability slated for the second quarter of 2000. Called the Inca M1, the box is a PBX powered by an Accelar switch. Inca stands for "Internet Communications Architecture" and is the product name for Nortel's IP voice products for locations without traditional PBXs. Other models in the new Inca series include larger campus-class IP voice boxes that can potentially support tens of thousands of users.

Also in the Inca line is a smaller voice switch on a Windows NT server, often referred to in the telecom industry as an "unPBX." The device is expected to compete with Cisco's Selsius voice switches and Lucent's IP Exchange Systems.

Meanwhile, for users with existing Nortel PBXs and key systems that they want to keep, Nortel announced the Meridian 1IP, Meridian SL100IP, M6500IP and Mercator IP Communications systems. Each device will get trunk-side and line-side IP interfaces to existing voice boxes. To complete the connection to the desktop, Nortel announced the i2004 Internet Telephone, with Nortel officials bragging that their product would be available in the fourth quarter of 1999, about six months before Lucent's expected introduction of a similar product.



By next year the Accelar routing switch may be the guts of Nortel's new PBX-like voice switch.

Nortel did not release pricing for its new products.

Analysts gave Nortel good marks for thinking through different users' situations. "It allows for a gradual migration, taking you from circuit-switched to a completely converged IP net, and gives you the ability to stop halfway there if you want to," says Ray Kneipp, a Burton Group analyst.

Nortel plans to manage all these products, plus Bay routers and switches, from the Optivity management platform. That will make moves, adds and changes simpler than the typical need to reprogram PBXs and move wires often, Kneipp says. IP with Dynamic Host Configuration Protocol allows you to plug your phone in and get an IP address, and then puts your location in the database. Your phone number never changes.

Senior Editor Tim Greene contributed to this story.

[1]Estimated reseller price for model 390/ENU. Actual prices may vary [2]Available only on model 770/8AU. [3]NSTL independent study using Winstone Perf. testing, July 1998. [4]SOFRES Intersearch, July 1998 mhz denotes microprocessor internal clock speed only, other factors may also affect application performance gb 1 billion bytes for HDD capacity PCs referred to in this ad include an operating system. IBM product names are trademarks of International Business Machines Corporation. Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation. The Intel Inside logo and Pentium are registered trademarks of Intel Corporation. © 1999 IBM Corp All rights reserved

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e business tools

Sun sharpens Java's enterprise edge

BY JOHN COX

SAN FRANCISCO — The big news at Sun's annual JavaOne conference this week will be the formal release of Java 2 Enterprise Edition, which packages Java's key technologies for building advanced Internet applications.

For the first time, Sun will be credible when describing Java as an application platform rather than just a programming language. Java 2 Enterprise Edition is a collection of programming interfaces and network services that makes it possible for corporate developers and software vendors to build, roll out, run and maintain large-scale, distributed applications.

A swarm of software vendors, notably those offering development tools or application servers, this week will introduce releases of their products that incorporate the Enterprise Edition APIs. Sun is expected to announce a rigorous certification and testing process to ensure that all these products will work together.

But it remains to be seen whether Sun can sustain the effort needed to define, maintain, improve and promote a Java-based software infrastructure for applications.

Enterprise Edition includes the basic Java elements released earlier this year in Java 2 Standard Edition, and it features extensions needed to build scalable, reliable applications, says Anne Thomas, senior analyst with Patricia Seybold Group, a consulting firm in Boston.

The new extensions include:

- The latest release of Enterprise JavaBeans, dubbed Moscone, which is a set of software components that run on servers.
- The newly announced JavaServer Pages, which lets HTML pages interact easily with JavaBeans.
- Java Messaging Service, for message-based communication among applications.
- Java Transaction API, for connecting to transaction services.
- The latest release of the Java DataBase Connectivity (JDBC) API, for accessing back-end databases.

Companies such as Tradex Technologies have migrated their software to Java, and Tradex's developers welcome Enterprise Edition because they will have to create fewer of the underlying services needed to run complex applications. Tradex sells Java-based software that lets companies create electronic marketplaces on the Internet where they can, for example, sell and buy excess steel inventories left over from production runs. According to Tradex Vice President John Corshen, Sun initially was too focused on Java running on the client and on ensuring that applications were "pure" Java, instead of concentrating on the type and quality of APIs and services that enterprise applications need.

Others see Enterprise Edition as the basis for what could be a fundamental shift in the industry.

"We are seriously researching using Java for our enterprise deployment applications," says Ezra Page, a software engineer at Austin Logistics, an Austin, Texas, company that builds Windows 98 and NT software for the financial services industry. Windows applications need a complex set of software layers, drivers and connections to a back-end database. All of these are sensitive to changes in Windows and the target databases.

"With Java, we need only a suitable JDBC driver and we're up and running," Page says. "Much of the interest in Java is in an attempt to become independent of a specific operating system."

But problems remain, and Sun must do a better job of addressing them, according to many developers.

"The Enterprise JavaBeans standard still requires considerable work," says Dirk Fromhein, president and chief technology officer at Watershed Technologies. "And improved communication [by Sun] with independent software vendors would improve the quality of the Java APIs. It's time a concerted effort was placed on creating a stable and fast virtual machine."

"The language has undergone major overhauls between versions, which forced major changes in development environments and in programming APIs, and invalidated a lot of existing code," says Christian Damus, a consultant at Holonics Data Management Group, a database consulting firm in Hull, Quebec.

Sun will have to solidify the gains it has made with Java 2 Enterprise Edition by addressing these problems, or the firm will risk being left behind as Microsoft continues to push its own distributed computing technologies. ◪

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This week's question:

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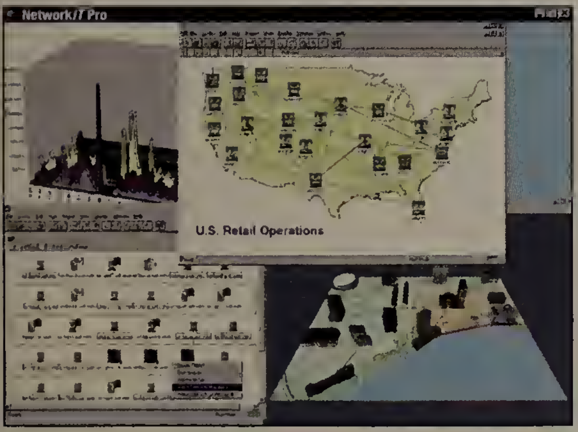

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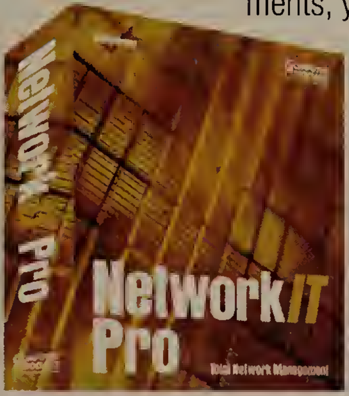

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Start-up will let users gang up Intel PCs

Former RS/6000 designers use best of symmetrical multiprocessing, clustering.

BY DENI CONNOR

AUSTIN, TEXAS — A pair of ex-IBMers think they have a better way of building low-cost multiprocessor servers.

Ted Scardamalia and Lynn West, both of who worked in RS/6000 development, have formed a company dedicated to building Intel-based systems that scale linearly to as many as 64 processors.

The new company is dubbed Times N Systems — the name hinting that the company's systems will process applications to the nth power.

The entrepreneurs claim that their systems will address the shortcomings of current approaches, such as symmetrical multiprocessing and clustering. Multiprocessing systems today are hindered by memory contention, I/O bottlenecks and latency issues, Scardamalia and West claim.

Times N will use a "share whatever you can" approach to memory management by giving each processor its own memory, as well as access to a general pool of memory available via an attached hublike device.

In effect, the company is taking the best of symmetrical multiprocessing by letting processors share memory. It is also taking the best of clustering, but giving processors dedicated memory and I/O as well.

But don't get your hopes too high about Times N because the firm still has plenty to prove. The company was formed only one month ago, employs just five people and has yet to move into its Austin office.

Times N, which has received $4 million in venture funding, doesn't plan to demonstrate a product for 12 months, and the company probably won't have a product shipping until the end of next year.

Still, industry observers are intrigued.

"The design has some promise," says Scott Winkler, an analyst with Gartner Group in Stamford, Conn. "However, it is very dependent on the cooperation of middleware companies, such as Oracle."

Winkler points out that IBM and other companies have looked into such a multiprocessing approach in the past.

Middleware and database software will need to be revised to run on Times N systems. Applications running on top of the middleware and databases will only need to be tuned, Scardamalia says.

Times N executives Wesley Reynolds, Lynn West and Ted Scardamalia have come up with a new way to do multiprocessing.

ED LALLO

Initially, Times N will support Windows NT, but the company plans to add Unix support later.

The company initially will provide a kit containing software, Gigabit Ethernet interconnects, a hublike device for accessing a shared memory and cabling. Customers can use the components to tie together existing Intel processor-based servers.

The use of off-the-shelf Intel servers could make Times N's offerings much less expensive than typical multiprocessing machines from the likes of Tandem, Winkler says.

The Times N software is key to the system's operation. The software will manage the hardware interconnects and the partitioning of application tasks across processors in one or more servers.

The software will also ensure that applications are seen as a single image by a Times N system, in order to protect data integrity.

"The fundamental problem is fooling the application into believing it is running on one system when it is not," says James Gruener, an analyst with Aberdeen Group in Boston. "If the company can do that effectively, then that's an interesting product."

Further down the road, Times N plans to implement its multiprocessor design in a single machine. Times N also will build in multiple paths to shared memory and interconnect redundancy. ◪

Corrections

Our review of network diagramming software (*NW*, May 3, page 57) should have stated that NetSuite Professional Series 5.0 costs $2,995 plus $12 to $20 per SNMP node for NetSuite's Node Pack. NetSuite's Professional Audit module and Toolkit do not cost extra. NetSuite offers Node Packs that can discover as many SNMP nodes as users require.

A recent story (*NW*, June 7, page 1) included a graphic on page 88 containing shipment projections for Novell Directory Services and Microsoft's Active Directory. The numbers in the graphic were mistakenly reversed.

The Scoop

The news behind the news

OUT WITH OLD, IN WITH NEW AT BANYAN

Remember Banyan? How about VINES, Beyond Mail and StreetTalk?

Well, this week Banyan is expected to launch Banyan Directory Services, an implementation and consulting service designed to help enterprises deploy the directory of their choice.

The service is more than a company marketing its expertise; It represents a major milestone in the remaking of Banyan.

Although the company has been wading in the services pool for some time, Banyan now appears to be preparing to take the big plunge, largely leaving its local-network software legacy behind.

In its 10-Q quarterly report filed with the Securities & Exchange Commission in May, Banyan said its strategic focus was "to decrease its reliance on its traditional networking software products while devoting additional resources to its network services and Internet business initiatives."

Banyan Directory Services, combined with an alliance the company signed in January with Microsoft to migrate Banyan users to Windows NT, Exchange and Active Directory, is providing ample evidence that Banyan's reliance on software is decreasing rapidly.

Banyan's sale earlier this month of a 35% stake in its Switchboard online search service to CBS also points to Banyan's increased emphasis on services.

Under the deal, CBS committed to widespread promotion of Switchboard.

All of this doesn't mean that current Banyan software customers will be left without support. Company officials last week said that Banyan does not intend to discontinue support of its software products. However, future software development may be another matter.

"They can stay the company they are, and die, or they can change businesses," says Harry Fenik, an analyst with Zona Research.

A look at Banyan's financial record of the past couple of years shows that the company can't ignore the dollars it reaps from services.

In each of the past two quarters, Banyan has generated 85% more in network services revenue than it did in the corresponding quarters last year.

Services revenue in the first quarter of 1999 was up $4.2 million, while software sales were down $3.4 million vs. the first quarter last year.

In April, Banyan's first-quarter earnings report noted the company's "strong start" ($457,000 in profit) was due to network services, the Microsoft alliance and the Switchboard subsidiary.

Banyan CEO Bill Ferry was quoted as saying, "We are particularly enthusiastic about the continued growth of our network services business."

He should be. Service and support business now represents nearly half of Banyan's total revenue, and 60% of the company's total work force is now engaged in this growing area.

— John Fontana

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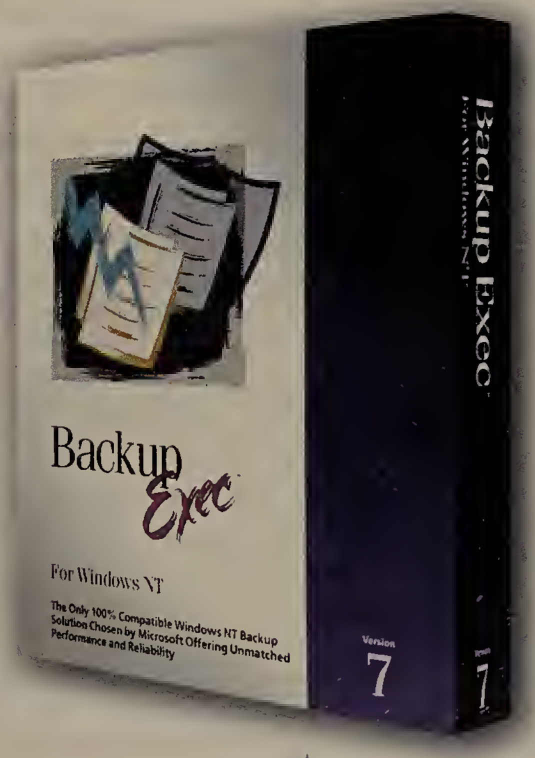
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Cisco, Motorola buy into wireless broadband

BY DENISE PAPPALARDO

Looking to grab a healthy chunk of the broadband wireless market, Motorola and Cisco last week announced their plans to acquire Bosch Telecom's local multipoint distribution system (LMDS) division for an undisclosed amount.

Under the terms of the agreement, Cisco and Motorola will set up a new company, known as SpectraPoint Wireless, to deliver wireless broadband services.

LMDS is a wireless broadband technology that operates in the 28-GHz and 31-GHz spectrums. LMDS will let service providers offer business users high-speed voice, data and video services quickly because they won't have to worry about installing expensive fiber-optic equipment.

Bosch Telecom was one of the first companies to sell LMDS equipment. In fact, Bosch's SpectraPoint products hit the market before those from LMDS competitors Alcatel, Ericsson, Lucent, Newbridge Networks and Nortel Networks.

While there are a handful of SpectraPoint products available today, Tom McCabe, vice president of product management at SpectraPoint Wireless, says the company's upcoming SpectraPoint 2200 will be the company's most robust product for wireless broadband network services.

The SpectraPoint 2200 will let service providers cost-effectively support transmission rates of 45M bit/sec downstream and 10M bit/sec upstream, he says. Service providers are expected to start testing the product next quarter. The company's existing SpectraPoint 2100 only supports T-1 and E-1 transmission rates.

At a customer site, a user would deploy a SpectraPoint receiver that would connect directly to a Cisco 2500, 2600 or 3600 router, says Shastri Divakaruni, director of engineering for broadband fixed wireless technology at Cisco.

Motorola's role, besides its controlling interest in the new company, will be deploying and integrating the SpectraPoint products.

Because LMDS is still a relatively new technology — the Federal Communications Commission only auctioned off LMDS spectrum licenses last year — there are many competitive local exchange carriers (CLEC) that will need help installing these new systems.

Nextlink is one of the new LMDS CLECs betting the bank on the wireless technology. Earlier this year, Nextlink acquired WPN, the largest holder of LMDS licenses, in a deal valued at a little more than $800 million. Nextlink is still evaluating equipment providers and plans to begin trials by year-end.

According to one analyst, most service providers will only start their LMDS trials in the next 12 months. "LMDS is an interesting alternative to fiber, but don't hold your breath. LMDS still has technology and operational issues," says Bob Egan, a research director at Gartner Group, a Stamford, Conn., consulting firm.

LMDS will let CLECs and other service providers quickly and cost-effectively offer their business users broadband access, but it is a line-of-site technology and the signal can be lost in heavy rain or snow. LMDS systems integrators are still determining how to optimally set up these networks, he says. "Early adopters should really consider their initial LMDS services as beta services," he says. It's going to take three to four years to get the kinks out and for these services to become popular, Egan says.

While LMDS is basically unproven, other fixed wireless technologies such as digital microwave and Multichannel Multipoint Distribution Service (MMDS) have a stronger track record. For instance, today Teli-

See **LMDS**, page 70

Working through fixed wireless

Service providers and equipment manufacturers are beefing up their fixed wireless network products and services. Here are a few explanations of the most popular fixed wireless technologies:

LMDS:
Local multipoint distribution system. A fixed wireless local-loop technology that lets service providers support high-speed data, voice and video traffic in the 28-GHz and 31-GHz spectrums. Bandwidth can range from1M bit/sec to 45M bit/sec.

MMDS:
Multichannel Multipoint Distribution Service. Originally designed to transport cable TV traffic over a wireless network, MMDS is now being deployed to support traffic in the 2.5-GHz to 2.7-GHz band. Bandwidth can range from 128K bit/sec to 3M bit/sec.

Digital microwave:
Fixed wireless services using microwave technologies are currently offered by service providers such as Teligent and WinStar Communications. Voice, video and data services are available in the 22-GHz to 38-GHz spectrums.

DSL,
continued from page 1

modems can work over long enough distances and recover quickly after DSL connections fail.

DSL-Lite, along with other flavors of the high-speed access technology, were the talk of SuperComm '99, a show geared mainly toward service providers and their suppliers.

Unlike other DSL flavors, DSL-Lite, also known was G.Lite, can be used in modems installed by customers and can support 1.5M bit/sec downloads. The modems are suitable for branch- or home-office connections to corporate networks via the Internet. The modems also support a regular voice channel over the same phone line.

Still, the Universal ADSL Working Group (UAWG), which organized the showcase, declared it a success.

"We thought if we could get six vendors here, this would be a successful event," says Mark Peden, the UAWG marketing committee coordinator.

But others were less enthusiastic because the tests were done under laboratory, not real-world, conditions.

"They can test the bejesus out of the technology, but they'll still have some problems when it's deployed," says Mike Lutz, director of product evaluation for DSL provider Darwin Networks. "At least for a while, it's going to be like analog modems were. There are going to have interoperability problems, and that will give the technology a black eye."

"These are not the last tests that will be needed to assure compatibility," says Ken Krechmer, editor of the "Communications Standards Review" and one of the authors of the DSL-Lite standard.

But Krechmer notes that the showcase overall drove vendors to hasten interoperability.

SUPERCOMM '99

Although the demonstration was held at SuperComm, the actual testing was conducted last month at the University of New Hampshire. During the tests, DSL modem makers had their equipment pass data over wire that was 6,000 feet long, according to participants. Typically, carriers hope to be able to deploy DSL-Lite over wires that are 12,000 feet or longer.

Also, the tests didn't require modems to perform fast retrain, which involves re-establishing a link quickly when a DSL connection is disrupted.

While insisting the demonstration was successful, the UAWG at the same time refused to publish the results of the interoperability tests. The only way to get the information was to travel from demonstration station to demonstration station and write the results down.

Even then, the results were partial. Vendors said they could demonstrate more compatibility, but could not get enough connections at their demonstration stations to do so.

Peden says that by summer's end, a test bed group will be appointed to certify whether DSL-Lite gear is interoperable. The testing group will be similar to CableLabs, the cable TV industry group that developed a standard for cable modems.

Joining the interoperability parade, purveyors of high-bit-rate DSL2 (HDSL2) technology — which essentially turns a regular phone line into a T-1 line— have established the HDSL2 Interoperability Consortium.

The group will fund a lab at the University of New Hampshire where HDSL2 vendors can test their gear for compatibility with other vendors' equipment.

Voice over DSL was also demonstrated widely at SuperComm, but it comes with the interoperability problems that all other flavors of DSL face. Vendors are starting to address interoperability issues, but there is no over-riding interoperability scheme yet.

Also at SuperComm, Adtran introduced yet another flavor of DSL — multi-bit-rate DSL (MDSL). This technology is said to work on phone wires as long as 30,000 feet without a repeater in the middle of the line to boost the signal.

The speed of the connection drops from 1M bit/sec on a line that is 15,000 feet long to 144K bit/sec on a 30,000-foot line. One problem with DSL deployment is that some sites are too far from phone company switching gear for DSL to carry over the line. Installing repeaters jacks up the price of service. ◪

What does interoperability mean?

To participate at the G.Lite Interoperability Showcase at SuperComm, digital subscriber line vendors had to prove their modems could:

- Use the standard G.Lite modem handshake.
- Sync up with at least two other modems, with one of them built around different chips from the ones in the modem being tested.
- Pass data and voice on the same line simultaneously without disrupting the data stream.

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Rainier,
continued from page 1

speeds, IBM claims.

Rainier could also become one of the crown jewels in IBM's plan to become a bigger player in the OEM realm. Michel Mayer, general manager of NHD, likens Rainier's role to that of Intel's Pentium processor. "Rainier will be an off-the-shelf network processor that we want to become as ubiquitous as the Pentium," he says. "The idea is to make Rainier work with everyone's switching fabric."

Mayer also said he expects Rainier to be an integral part of high-end IP switches from major network vendors within a year — though he declined to say which vendors were looking at using the chip.

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- A Q&A with Michel Mayer, general manager of NHD.
- A technical overview of IBM's Prizma chip.

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IBM has had some success OEMing its technology to other vendors. Alcatel, Nortel Networks and others use the Prizma chip. Cisco, Xylan and Juniper Networks also use IBM technology in their products. NHD is now part of IBM's Microelectronics group and intends to use that division's extensive reselling channels to deliver Rainier.

NHD is looking for a success story as it is trying to redefine its role in the network equipment market and within IBM's hierarchy (*NW,* May 31, page 1).

The success of this chip is an open question and will depend on vendor acceptance, says Frank Dzubeck, president of Communications Network Architects, a Washington, D.C., consultancy. A number of companies besides IBM are building network chips, but Dzubeck notes this is one of the first QoS chips to come out. "It's very sophisticated," he says.

The first Rainier chip will appear in modules in new IBM IP switching devices within the next year, company sources say.

> **"Rainier will be an off-the-shelf network processor that we want to become as ubiquitous as the Pentium."**
>
> Michel Mayer, general manager of NHD

Rainier will also be used in an upcoming line of IBM hybrid switch-routers and new server interconnect devices that will let users link and load balance high-capacity servers. It has yet to be determined how IBM's new devices will be configured.

Initially, Rainier will support 40 Fast Ethernet or four Gigabit Ethernet ports, says Marco Heddes, a system engineer at NHD. It will handle Ethernet and packet-over-SONET traffic and act as a bridge between those networks. Later, IBM will support ATM.

Adding greater flexibility to resellers or enterprise network users, Rainier will be programmable to handle specific types of policy and high-speed encryption and decryption operations, he says.

Rainier will also work with IBM's recently announced policy engine, a directory-based management technology that eases prioritizing access to net resources (*NW,* Feb. 8, page 1). Users will be able to program Rainier to perform lookups in its database for virtual LAN identification.

After its first release, possibly in the next half year, there will be new iterations of Rainier every six months. ◪

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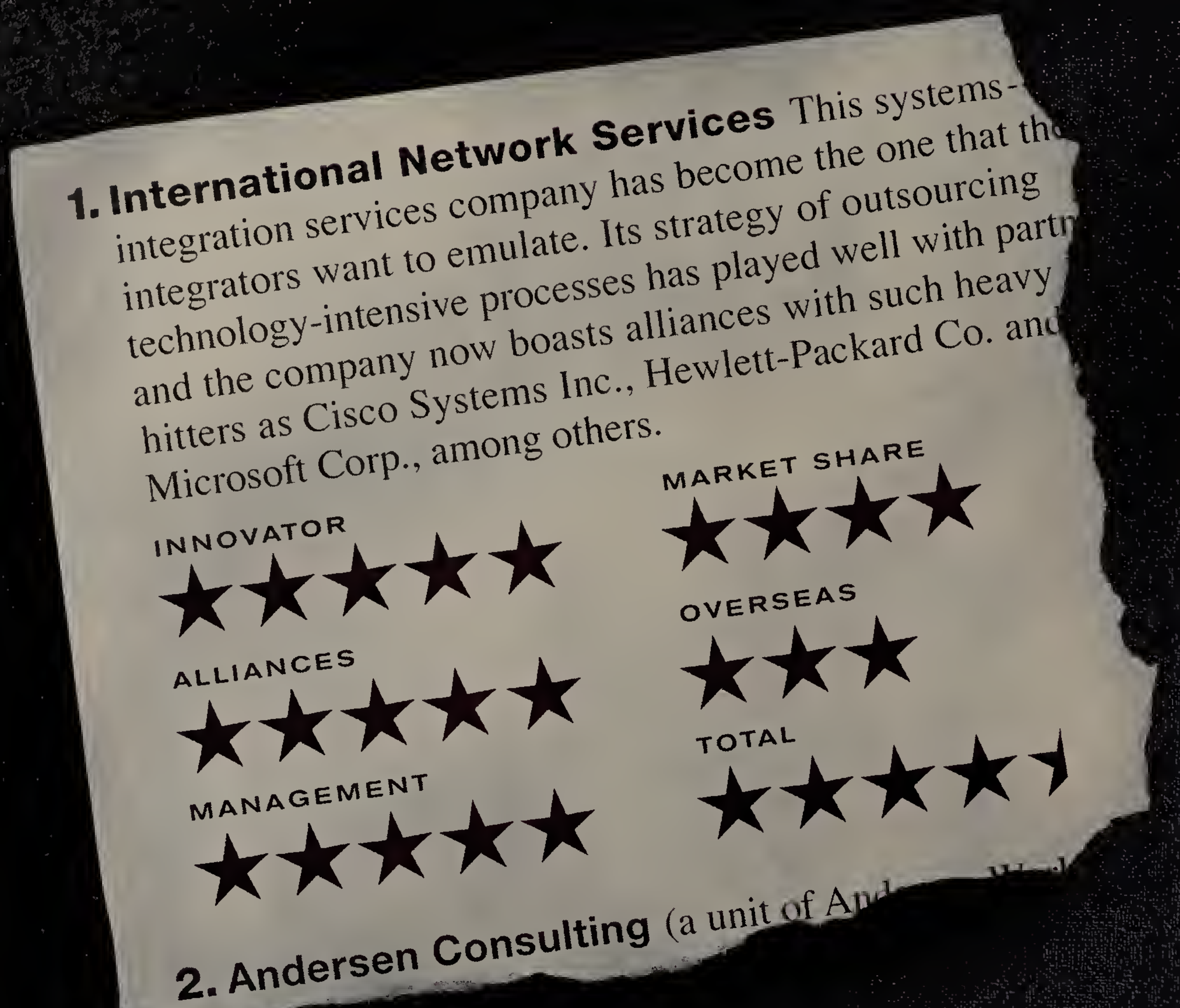

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INNOVATOR ★★★★★

ALLIANCES ★★★★★

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2. Andersen Consulting (a unit of An

–*Yankee Group/Upside Magazine,* FEBRUARY 1999

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The new face of Cabletron Systems

Former YAGO Systems CEO looks beyond enterprise networks to emerging markets.

NetworkWorld Q&A

Piyush Patel, Cabletron Systems' new CEO, has an aggressive game plan to stimulate revenue growth and keep the beleaguered company on the cutting edge of new markets and technologies. The former CEO of YAGO Systems, a router company acquired by Cabletron last year, has replaced Cabletron co-founder Craig Benson. Patel shared his thoughts about his new job with Network World *Senior Editor Jim Duffy.*

What are your priorities?

Our basic focus is going to be on emerging growth markets — service providers, multiservice cable operators, digital subscriber line, content hosting and server load balancing.

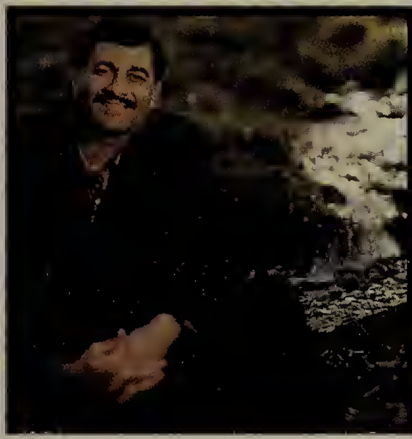
There's also another market — we call it multidwelling units. It's small, intelligent malls and apartments. In the last couple of months, we've been bringing out products [including WAN products introduced last week at SuperComm '99 in Atlanta] and building the relationships in those areas. This includes not only hardware products with Layer 3 and 4 features over the WAN links, but also Spectrum [network management] and professional services.

Another thing that is doing very well is the outsourcing model — more leasing-type options from service providers. We've been talking to a couple of service providers about leasing options in which we charge per port, and they turn around and charge whatever we charge per port and then something else.

Also, we've been pretty strong in the enterprise market, and we intend to keep fueling that marketplace with new products.

What's been holding Cabletron back up to now?

See **Patel**, page 22



SHAWN HENRY

Piyush Patel at a glance

- Former CEO of YAGO Systems, a Layer 3 Gigabit Ethernet switch start-up. YAGO was one of *Network World's* 1998 companies to watch.
- Over the past 20 years, served in various technical and management roles at Intel, Sun, MIPS Systems and QED.
- Earned his master's degree in Computer Engineering from the University of Wisconsin-Madison.

NuView aims to ease NT cluster management

New module supports policy management and allows dynamic load balancing across servers.

BY DENI CONNOR

NuView has rolled out new software for managing clusters of Web servers based on Windows NT.

The new software lets companies better manage clusters of servers running Microsoft's Windows NT Load Balancing Services (WLBS), a technology for distributing the processing load across a group of servers.

The new software is an add-on to NuView's ClusterX, a package for managing NT server clusters running Microsoft Cluster Server (MSCS). MSCS allows a group of independent servers to be managed as a single server to increase availability.

Dubbed the ClusterX for WLBS Cluster Management Module, NuView's new software simplifies the process of establishing and enforcing management policies for servers running WLBS.

Microsoft WLBS clusters are primarily used for load-balancing applications and servers running on server farms or virtual private networks, or as Web or File Transfer Protocol servers.

"NuView's ClusterX WLBS module allows dynamic load balancing among servers that share a single IP address, making it easier to scale services across the network," says James Gruener, an analyst with Aberdeen Group in Boston. "It simplifies deployment of clusters and increases their manageability."

The software can be used to address application and server failures, and improve performance, availability and scalability.

Users can discover WLBS clusters, configure server nodes and duplicate configurations among servers. The software can also be used to detect software, hardware and network faults and to create reports, audit logs and uptime statistics for service-level agreement enforcement.

ClusterX is compatible with Microsoft's ActiveX, Distributed Component Object Model and Microsoft Management Console (MMC) technologies. It is designed to work with Windows 2000 Advanced Server and Data Center when they become available.

The management software can be activated from within Internet Explorer 4.0 or MMC.

The new ClusterX module will be available in July and will cost about $1,000 per management station.

ClusterX is $2,000 per management station.

NuView: (281) 497-0620

Briefs

MTI Technology has unveiled DataSentry, local and remote mirroring software for its Fibre Channel-based Gladiator RAID storage arrays. DataSentry can be used to test Y2K compliance, guarantee availability during system maintenance and increase application availability.

The software can also be used for backup and disaster recovery, and data can be rolled back to a previous version if necessary.

DataSentry also allows data replication from other vendors' RAID subsystems to MTI systems. The software is compatible with RAID 5 technology, dubbed "poor man's mirroring," in which data is striped across disks with parity. In RAID 5 you can lose the data on any one disk and reconstruct it from parity.

The software operates on HP-UX, IBM AIX and Sun Solaris. Next year, MTI will add support for Windows NT.

DataSentry ships this month and costs $150,000 for two RAID system licenses.

MTI: (714) 970-0300

Intel has taken its first step into the storage-area network (SAN) market by making an equity investment in **Crossroads Systems** worth more than $5 million.

Crossroads makes Fibre Channel-to-SCSI routers and will use the money to develop products that provide SANs with access to Gigabit Ethernet and WAN links. The company is also working to make its products support Intel's next-generation I/O technology, which is designed to speed server processing. According to an Intel spokesman, Crossroads is one of the "emerging companies in SAN technology," and its products will forward Intel's goal of one billion connected PCs and servers.

Crossroads: (800) 643-7148

Wyse puts new spin on thin client

Winterm 5355SE stands apart from Windows terminals; boasts browser based on Netscape technology.

BY JOHN COX

SAN JOSE — Wyse Technology this week will introduce a thin client that relies far less on Microsoft software than typical Windows terminals do.

The Winterm 5355SE, which Wyse calls a network terminal, can be used to access applications running on servers outfitted with Microsoft's Windows NT 4.0 Terminal Server Edition (TSE) multiuser operating system. However, the terminal doesn't require use of Microsoft's Windows CE thin-client operating system or other Microsoft protocols.

Wyse's new offering also features a Web browser based on Netscape technology. By contrast, Microsoft's licensing forbids Windows-based terminals — which connect only to machines running Microsoft TSE — to use a local Web browser.

The 5355SE is essentially a display device: End users view data or access applications that run on networked servers. The terminal comes equipped with a built-in e-mail client for simple messaging and new software for accessing server-based applications.

The small box sits on a desktop, attaches to a color monitor and plugs into any 10/100Base-T Ethernet network. The 5355SE can boot from its local software, and it displays a multiwindow user interface devised by Wyse that lets end users access multiple servers simultaneously. The terminal comes loaded with an array of network protocol software and terminal emulators.

New with this model are two software packages for connecting to server farms. The first is Citrix Device Services, which lets the network terminal connect directly to Microsoft TSE via the Citrix Independent Computing Architecture protocol. Previously, customers needed to have Citrix Metaframe software running on the TSE server.

The second new package is client code for attaching to The Santa Cruz Operation Tarantella servers, which provide connections to assorted back-end application and data servers.

Wyse's new thin-client machine can access multiple servers at the same time.

Like other thin clients, the 5355SE doesn't require the care and feeding, not to mention the hardware and software upgrades, of traditional Windows PCs.

As a result, the network terminal will reduce desktop computing costs and keep them low, especially as customers shift more data and applications to powerful servers, Wyse executives say.

The 5355SE runs TCP/IP, PPP and Dynamic Host Configuration Protocol. The terminal has a 10/100Base-T Ethernet interface, two USB ports, two serial ports, one parallel port and a 32-bit CardBus slot for PC cards.

The box is powered by a 200-MHz MediaGX microprocessor from National Semiconductor.

The 5355SE is available now for an estimated street price of $840, which covers all client software and protocols.

Wyse: (800) 438-9973

Frame relay device promises to cut video costs

BY TIM GREENE

ATLANTA — DICA Technologies last week introduced a device that can save customers money by letting them eliminate ISDN lines dedicated to videoconferencing traffic.

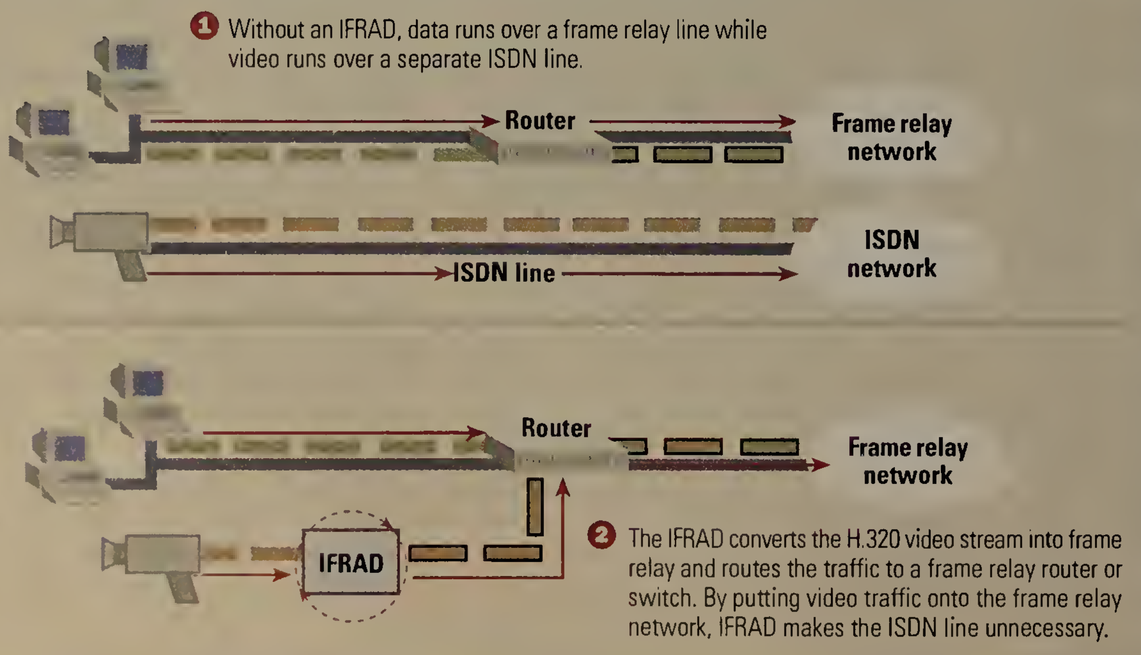
The company's new IFRAD offering, which sits between an ISDN-based videoconferencing system and a router on the customer site, is designed to let companies consolidate video and other traffic on frame relay links.

The box, which made its debut last week at SuperComm '99 in Atlanta, converts ISDN video streams into frame relay frames, and vice versa.

IFRAD users need to add bandwidth to their frame relay nets to support video traffic, but that will typically be less expensive than running separate ISDN lines for video. ISDN lines are billed based on use and are subject to long-distance charges, says William Flanagan, program director for Net-Reference, a Sterling, Va., consulting firm.

Videoconferencing for less

DICA Technologies' IFRAD can reduce the need for ISDN lines dedicated to videoconferencing by putting video traffic onto existing corporate frame relay networks.



❶ Without an IFRAD, data runs over a frame relay line while video runs over a separate ISDN line.

❷ The IFRAD converts the H.320 video stream into frame relay and routes the traffic to a frame relay router or switch. By putting video traffic onto the frame relay network, IFRAD makes the ISDN line unnecessary.

BP Amoco plans to use IFRADs to set up videoconferences for sites in countries where ISDN is unavailable, according to Rick Gibson, senior telecommunications specialist for the firm. For example, in most Latin American countries, it is possible to set up dedicated circuits to most sites and run frame relay over those circuits, he says.

Amoco currently uses separate dedicated links for videoconferencing at its sites without ISDN access, and that can cost $10,000 per month for 12 hours per month of videoconferencing, Gibson says. Using IFRADS would drastically cut costs. In addition, when the videoconferencing gear is not in use, the extra bandwidth can be used by other applications, he says.

IFRADs work across any frame link, so Amoco is even looking at using them to set up videoconferences across satellite links between offices and oil rigs at sea.

Cost savings from frame relay compared with ISDN can be significant on international calls, Flanagan says. "There's no toll charge with frame relay," he says.

Customers may have to move from 56K bit/sec to T-1 frame relay links to accommodate the video traffic, but they should still save money, given that the price gap between 56K bit/sec and T-1 frame relay access lines can be as little as $200, Flanagan says. It would cost more than that to run a separate ISDN line, he adds.

Because of frame relay's overhead, it takes 160K bit/sec of frame relay bandwidth to handle a 144K bit/sec ISDN videoconference. It takes 448K bit/sec to handle a 384K bit/sec ISDN videoconference, DICA executives say. Customers using frame relay for videoconferencing would have to devote a virtual circuit with the appropriate bandwidth, they say.

The IFRAD is available in two models: one with a single Basic Rate Interface port that handles 144K bit/sec videoconferencing and one with three BRI ports that handles higher-resolution 384K bit/sec video.

Pricing for the IFRAD starts at about $2,000. It will ship at the end of the month.

DICA, which was created last year when Promptus Communications merged with the German firm Data TeleMark, specializes in ISDN access products.

DICA: (800)777-5267 or www.dicatech.com

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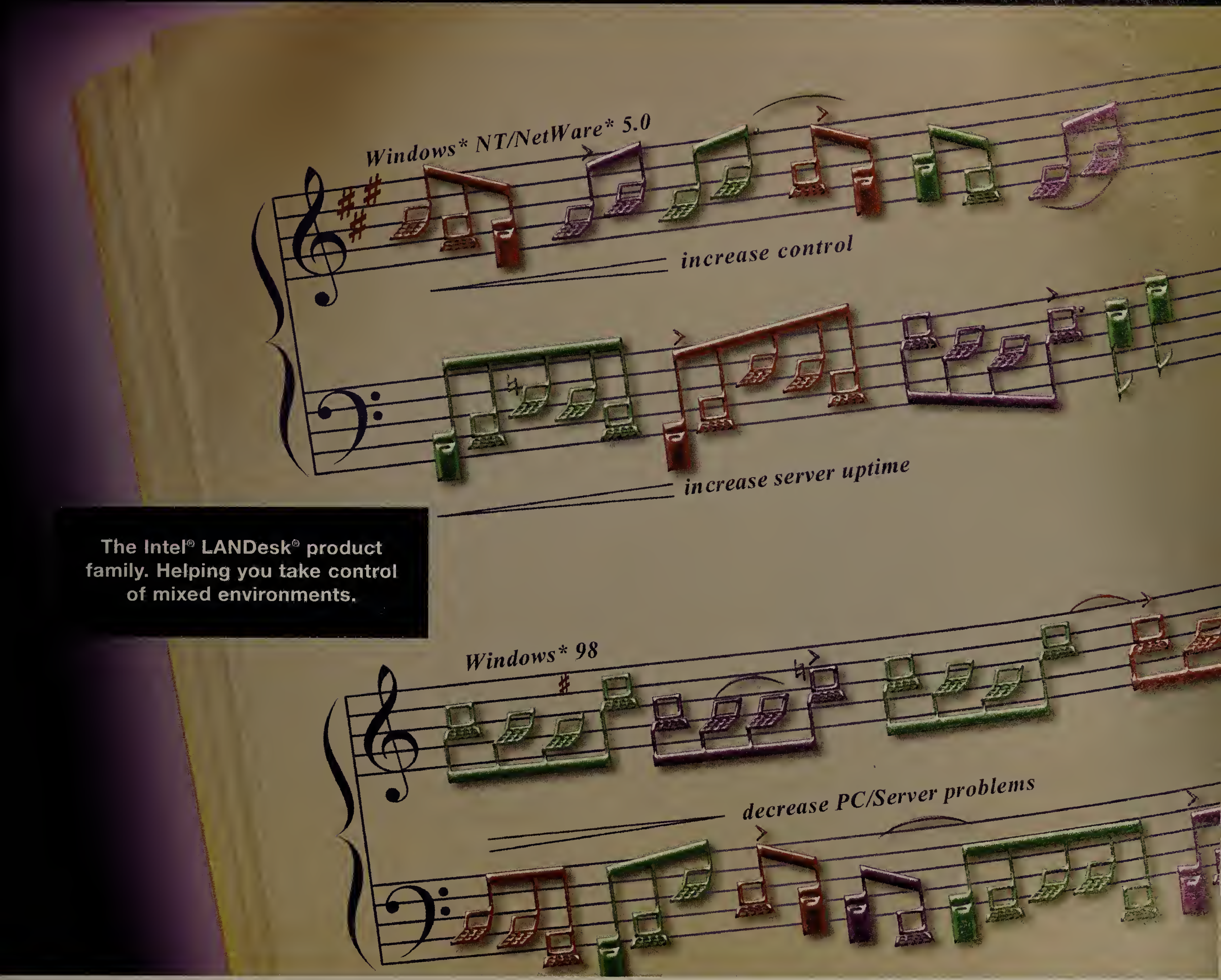

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Patel,
continued from page 19

We used to be in the hub market. We've transitioned. Ninety-five percent of our revenue is from completely new products that came out over [a one-year period].

That's the reason the revenue growth doesn't look as big as it should.

We've also been more enterprise-focused and haven't done a very good job of focusing on the service provider marketplace.

As you know, the enterprise market is growing only 8% year-to-year vs. the service provider market, which is growing over 40% year-to-year. The service provider market is a huge opportunity. We are going to focus a lot of our effort at going after that market.

What are Cabletron's challenges going forward?

We need to expand our customer base going into the service provider market or any new emerging market. Also, we need to stay open to all the different possibilities — either partnership with a [group of telecommunications firms] or investment from them to work on some joint projects.

What's the likelihood that Cabletron will remain independent?

Right now the focus is on expanding the customer base and continuing as a smaller, fast-moving company, and to keep attacking the service provider marketplace.

As you know, consolidation is going on in the marketplace with the rapid growth in voice and data. Right now, none of the companies have any revenue coming out of voice/data convergence.

So there's no dominant player in that market right now. We are working hard on the voice strategy and have some products that are doing very well in the market.

We'll continue to do partnerships with telco companies, and if they fan out [into more than that] we'll be open about that. So we're not ruling out any possibilities.

What prospects do you give Cabletron for success going forward, given that Cisco is approaching $15 billion in annual revenue, 3Com is teetering at the edge of being acquired, and Bay has been swallowed up by Nortel Networks?

Cisco's definitely made big inroads into a lot of markets, but the overall marketplace is huge — hundreds of billions of dollars if you put all of the data communications businesses together. We want our fair share of the marketplace.

We have good product technology and a loyal customer base that we need to expand on. In the last two quarters we've been hitting the expectations that we set for ourselves, and I think we'll continue to hit them. ◪

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Internetworking Monitor . Neil Anderson

NEXT GENERATION INTERNET: WORK IN PROGRESS

The Next Generation Internet (NGI) initiative that my partner Kevin Tolly wrote about earlier this year is picking up steam, fresh from the success of our NGI Forum meeting a few weeks ago (*NW*, Jan. 11, page 22).

An inquisitive group of 50 users, vendors and service providers gathered late last month at the University of Virginia's Center for Innovative Technology in Herndon, Va., to explore issues such as IP multicasting, policy-based networking and service-level agreements (SLA). What struck me as odd, though, was the sentiment among some participants that the NGI already exists.

Keynote speaker Richard Mandelbaum, chairman and CEO of Applied Theory, spoke about network intelligence and addressed the issues surrounding the particular layer at which those smarts should reside. Interestingly, his company's Web site touts Applied Theory as "The Next Generation Internet Company."

These remarks about NGI are in contrast with the overriding theme of the day: While we're making great strides toward a unified implementation of the NGI, we aren't there yet. The NGI is a future phenomenon, not quite near the level of maturity required to support ubiquitous user traffic on a national, let alone international, basis.

In fact, the NGI Forum meeting was chock-full of examples that underscored the strides that have been made with NGI, as well as the steps still left to take.

Attendees debated the merits of IP multicasting and where it fits into plans for the NGI. They also questioned whether implementing IP multicasting at the lower layers of a multivendor switch/router network in the NGI is the way to go, or if the problem can be better solved with a mesh of Web-caching proxy servers running over a less intelligent network.

A panel of quality-of-service (QoS) experts produced some mildly worded challenges. However, in the end, the panel's consensus surprised no one: If your applications have tight QoS requirements on throughput, latency, etc., then deploy ATM. But you can bet the IP community will solve such QoS-related issues in a pure IP environment in the near future.

Experts also discussed SLAs from the perspective of how they must evolve — they need to become more tightly aligned with customers' business and real-time applications as opposed to the coarse, averaged performance metrics common in many of today's reports.

All the questions raised and the issues debated left one point markedly clear: We have a ways to go. Indeed, there may be pockets of technologies available today that will play a role in the eventual NGI amalgamation, but, in and of themselves, they do not form the NGI.

Through continued discussions among users, vendors and service providers, NGI will eventually take shape.

Anderson is chief operating officer of The Tolly Group and serves as Secretary/Treasurer of the NGI Forum. Anderson is filling in for columnist Kevin Tolly this week and can be reached at (732) 528-3300, nanderson@tolly.com or www.tolly.com.

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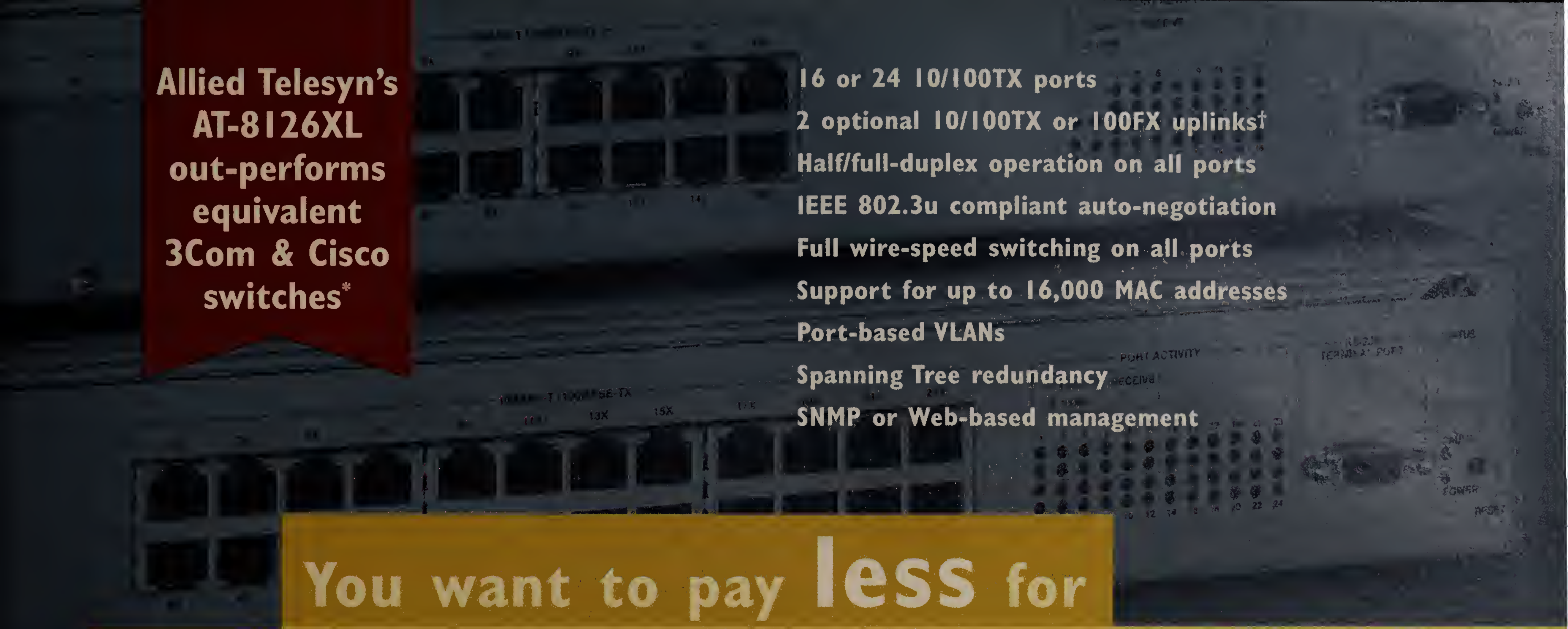

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*Collaborative Research Study, John Katsaros, 1999. Based on this study, "Mail Plus: The Real Issue in Comparing Lotus Notes/Domino with Microsoft Exchange," not only is the Total Cost of Ownership (TCO) of Lotus Notes/Domino and Microsoft Exchange essentially the same, but a Lotus Notes and Domino solution provides far more messaging functionality and value than Microsoft Exchange. You may have found Microsoft's "99.9% reliability" claims difficult to digest. Exchange is limited to the performance and reliability of the NT platform, which has been shown to have only 97.44% availability, according to the IDG/Gartner study, October 1998. Lotus Domino runs on NT as well as platforms such as S/390 that provide 99.998% availability. Sales data based on total Notes seats according to EMMS 4Q 1998 Report.

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Briefs

GTE Internetworking last week introduced **Unified Messaging Service,** which gives customers access to voice, e-mail or fax messages via a phone or PC. It also notifies customers via pager, wireless phone or e-mail when they get messages. To retrieve messages, customers dial in to a local phone number, so there will be no toll charge for using the service in the 50 areas where GTE will set up local numbers. The service converts e-mails to speech and sends audio files of voice mail to a PC. The service is being wholesaled to other carriers, but it should cost about $15 to $20 per month, per account. The service will be fully deployed by year-end. For more information, go to www.gte.com.

The first crack has appeared in **Iridium's** strategy of offering its global satellite calling service at a superpremium price. One of its distributors, Seven Seas Communications of Fort Lauderdale, Fla., has cut its rate range to $1.59 to $4.29 per minute, down from the $3 to $7 charge Iridium was originally asking. Analysts have been begging Iridium to develop a new pricing strategy after the company posted gigantic first-quarter losses and had to restructure its agreements with lenders.

ISP Sanswire.Net last week said it will deploy IP telephony gear from **Hypercom** to provision user services in about 140 cities worldwide. Hypercom's Network Systems division will supply turnkey gear such as its IP.tel voice-over-IP gateways; credit and debit card payment acceptance platforms; and a central billing system. Sanswire.Net plans to offer IP telephony services in 15 U.S. cities and seven international locations by year-end.

RBOCs choke on termination-clause proposal

BY DAVID ROHDE

WASHINGTON, D.C. — Regional Bell operating companies are running to the Federal Communications Commission to save one of their best customer-retention tools: long-term user contracts with severe termination penalties.

The Bells are ridiculing a proposal by small competitive local exchange carrier (CLEC) KMC Telecom to eliminate financial penalties for users who end their Bell contracts early to switch carriers.

New Jersey-based KMC filed the petition at the FCC after it found that many customers who wanted to switch could not because they'd be socked with five- or six-digit RBOC termination fees (*NW,* May 10, page 39). Now the RBOCs say such penalties are normal business practice, unnecessary to competition, and in any case, none of the FCC's business.

Seizing on what they believe are legal mistakes in KMC's petition, the Bells are urging the FCC not to order up something the government won't be able to defend in court.

For example, lawyers for Bell Atlantic claim in a June 3 letter to the FCC that any agency rule banning RBOC termination penalties would amount to "pre-emption" of state laws. The lawyers argue that many of the RBOC contracts in question deal with local dial tone and other services found in state, rather than federal, telecom tariffs.

The Telecommunications Act of 1996 allows the FCC to pre-empt state regulations but only under strict guidelines. For example, say the Bell Atlantic attorneys, a "wholesale pre-emption" is not allowed, and KMC must state precisely which services should be free of termination penalties.

And if KMC or the FCC chooses a particular category, such as high-speed data services, on which to end termination penalties, Bell Atlantic says it's prepared to show those are the services that are already most competitive.

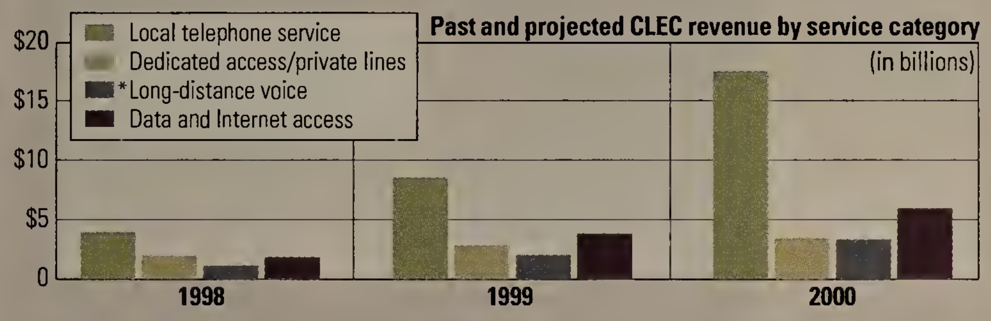
For example, the original KMC petition cites a Bell Atlantic penalty of between 30% and 100% of the remaining term on Digital Data Service contracts. "But the term discounts for that service are so steep — up to one-third off month-to-month rates — that depending on when a customer terminates, it could be better off buying the term rate and terminating early," says Bell Atlantic's letter. "Such a provision can hardly be considered a complete block to KMC's ability to compete."

Likewise, SBC Communications told the FCC that without termination penalties, it might not even offer discount contracts. "Early termination charges are also used in many instances to recover installation charges that have been previously waived for the customer," SBC says.

Severe termination penalties are hardly unique to RBOCs, SBC adds. The company presented a 39-page appendix to the FCC showing similar penalties from long-distance carriers and CLECs, including AT&T and MCI WorldCom's local divisions. And BellSouth chimed in, saying KMC's claim that termination clauses block competition is "bogus" because CLECs now serve about one million lines in BellSouth's territory. ◪

Somebody's getting the business

CLECs are growing across all major product categories even as they fight alleged competitive barriers.



SOURCE: NEW PARADIGM RESOURCES GROUP, CHICAGO

*Generally resold from national network carriers.

Judge orders AT&T to open cable net

BY DAVID ROHDE

PORTLAND, ORE. — AT&T's newly acquired broadband cable lines may have to be made available to all ISPs and their customers after all.

The federal district court in Portland, Ore., ruled June 4 that the local board doling out cable TV franchises has the right to insist that AT&T provide open access to its cable systems. That ruling contradicts a recent Federal Communications Commission decision that basically lets AT&T keep cable TV-based local loops to itself as the carrier buys up cable properties.

AT&T has insisted that government regulators shouldn't force the company to make its cable lines available to independent ISPs such as America Online, though AT&T officials claim they may eventually choose to do so.

For now, the Portland decision only applies to the local market, where AT&T bought the cable system from Tele-Communications, Inc. (TCI) and doesn't overturn the FCC's national policy. But the decision may open the floodgates to similar court rulings elsewhere, leaving AT&T's cable strategy in limbo.

AT&T lobbyists had battled tenaciously against local cable authorities who had threatened to hold up its TCI merger on the open access issue, with Portland's cable board one of the last holdouts.

Mark Rosenblum, AT&T's vice president-law, called the Portland decision "inexplicable." He claimed the federal judge's decision failed to address many of AT&T's legal arguments, leaving the way open to an appeal. Without promising such an appeal, Rosenblum said, "Clearly we will continue to pursue our legal case." ◪

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Eye on the carriers . David Rohde

HOW CONVERGENCE COULD COST YOU MONEY

Most people who are skeptical about converged voice and data networks say they think shipping voice over packet networks might not work very well. But even for them, it's often an article of faith that if convergence works, it will save users money.

Is that true? Even that much is not totally clear, according to a few acute observers of the carrier scene.

Certainly if you take today's transport costs and start eliminating some toll charges, you'll save money.

But no one believes transport costs are going to stay where they are forever. On the broadband side, carriers are installing 1.5M bit/sec digital subscriber line circuits that are a fraction of the cost of dedicated T-1s; optical networks that eliminate expensive electronics; and circuits that split bands of light into separate paths for four, eight, 36 or whatever times efficiency.

On the narrowband, voice-grade side, telephone tolls keep dropping. On July 1, local exchange carriers have to lower their access charges to long-distance carriers again. Is your carrier passing along the savings? You might want to bring that factoid to the negotiating table.

Take note of the converged voice/data network offers coming from carriers. I think you'll see that most of them so far, and almost certainly most in the near future, will be managed nets. That means there will be many charges in any contract, including not just the usual access, port and circuit charges, but also equipment leasing fees and so on.

Telecom analyst Steve Sazegari also points out another factor in the convergence stakes. Among the legacy carriers, convergence has become a fancy way of saying "ATM" without going through the heartache of selling that long-maligned technology. Usually through a carrier-managed ATM access box, the carrier can aggregate voice, video, fax and data traffic onto a single circuit.

But how much simpler it would be, Sazegari notes, to take native IP and throw it directly onto those screamingly fast optical networks that carriers are now examining. If nothing else, this would eliminate ATM's overhead and the need to fool with its multiple adaptation layers. Sure, without ATM maybe you couldn't yet be sure that toll-quality telephone calls could ride over the same network. But at some point — as corporate voice drops below 6, 5, then 4 cents per minute and perhaps even less — the returns from doing so grow less and less.

Asked about convergence cost savings, many carriers like to talk about "total cost of ownership," as in, "Our service will save you 15 to 25% off the total cost of ownership of managing dual networks." What they don't want to talk about is the actual savings. The reality is that much of convergence today is about account control — the ability for carriers to lock you in as they face growing competition.

So the jury is still out on the real question: Will convergence save you money, or is it an excuse not to lower prices dramatically on existing broadband data services right now?

Rohde is a senior editor with Network World. *He can be reached at drohde@nww.com.*

On cost-effective network management, Kendall-Jackson makes a case for NetSolve.

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Mark Bouchard
META Group

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Briefs

Foundation Technologies in Waltham, Mass., a maker of self-service applications for human resources departments, has changed its name to Authoria, Inc.

The company also renamed its flagship Beneflex product Authoria HR.

Among those companies using the software are Allied-Signal, Ford, Sears and Travelers Insurance.

Authoria: (781) 530-2000

BroadVision has taken its One-To-One Commerce 4.0 product for selling products online and split it into two separate offerings: Business Commerce 4.0 for business-to-business electronic commerce, and Retail Commerce 4.0 for online consumer retailing.

The two products, which each start at $75,000, are expected to ship this month.

BroadVision: (650) 261-5100

Network management vendor **NTP Software** last week released List Manager 6.0 for Microsoft Exchange Server.

List Manager provides Exchange with list server features common to the Unix platform.

Users can subscribe and unsubscribe to discussion groups or lists that automatically send e-mail to their in-boxes. List Manager supports distribution lists stored in the Global address lists and Personal Address Books of Exchange and lets administrators designate moderators and owners for particular lists.

The product also features administrative tools for automating updates of lists.

List Manager is priced at $4,130 per server and is available now.

NTP: (800) 226-2755

IN-SITE: *Lessons from Leading Users*

Campus Web site built in a flash

BY ROBIN SCHREIER HOHMAN

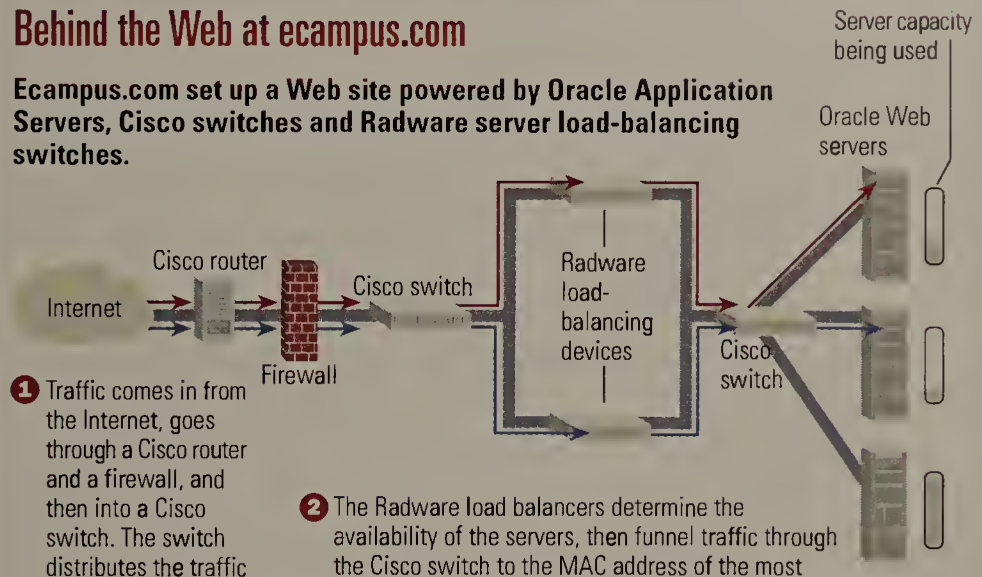
Next time the University of Connecticut wins the NCAA title, you'll be able to buy victory T-shirts right off the Web.

Sports fans, college students and the curious can soon satisfy their cravings through ecampus.com, a Web site that will sell university apparel, textbooks and educational material from all over the country. Surprisingly, it has taken the start-up less than five months to assemble the infrastructure for what could become a multimillion-dollar site.

The ecampus.com idea came about when Wallace's Bookstores thought about going online, says Steve Stevens, president and CEO of ecampus.com and president of Wallace. A competitive analysis revealed that almost no one online was taking advantage of the $100 billion textbook market.

Behind the Web at ecampus.com

Ecampus.com set up a Web site powered by Oracle Application Servers, Cisco switches and Radware server load-balancing switches.



❶ Traffic comes in from the Internet, goes through a Cisco router and a firewall, and then into a Cisco switch. The switch distributes the traffic to two Radware server load balancers.

❷ The Radware load balancers determine the availability of the servers, then funnel traffic through the Cisco switch to the MAC address of the most available server. The switch distributes the traffic as directed by the Radware boxes. The two Radware boxes offer redundancy.

Stevens turned to Oracle's Advanced Technology Solutions, a consulting group primed to put businesses on the Web — fast. The Oracle group runs a large test lab in Herndon, Va. According to Brent Tuttle, director of operations at ecampus.com, the Oracle consultants put together a mixture of Oracle Application Servers, Oracle database servers, Radware server load balancers and Cisco switches to form the back end of the ecampus.com site.

Because ecampus.com started with no network gear, it could afford to take all of Oracle's advice. That made putting up the Web site almost easy. "It enabled us to unpack the boxes, screw them into the racks and plug them in, and from a Friday to a Sunday we were up," Tuttle says. It wasn't a no-brainer — Tuttle says no one's gotten much sleep in the past few months — but it meant everything worked out of the box.

Ecampus.com is running Fast Ethernet over Cisco 3000 series routers on the edge, Cisco 2000 switches inside, and Radware WSD Pro server load-balancing devices in front of several flavors of Sun servers running Solaris 2, 6 and 7. The company is also using Oracle 8.05 and Oracle Application Server 4.0.7.

The Radware WSD Pros are called server load balancers, but they're also being used for fault tolerance and scalability. While most networks using server load balancers deploy them in front of a server farm or hanging off a switch, ecampus.com is putting the WSD Pros between two internal Cisco switches.

All this doesn't come cheap. The company won't divulge the names of its investors, but it will spend $23 million in advertising this year alone. ◪

File transfers on steroids

CA's TransportIT add-on for Unicenter is a powerful tool.

BY STEVEN GOLDBERG

NetworkWorld REVIEW

Amidst the e-frenzy that defines today's computing world, it may not be particularly glamorous to focus on something as mundane as file transfers. Nevertheless, ask any administrator responsible for updating content across a wide heterogeneous enterprise, and you are likely to get an earful on this subject.

Customers using Computer Associates' Unicenter TNG systems management platform now have a new weapon in their arsenals — TransportIT.

TransportIT, which CA officially announced last week, is an add-on focused on transferring files across multiprotocol networks and a variety of operating systems. TransportIT supports Windows NT and 9X, Unix clients and NetWare; Unix, AS/400 and MVS servers; and the TCP/IP and IPX network protocols. The product's comprehensive platform support and its

See **Review**, page 34

Net Results

TransportIT 1.0

Computer Associates
(800) 225-5224
www.cai.com/products/transportit.htm
Price starts at $1,300 per server and $110 per client.

Pros

- ▲ Exploits Unicenter framework for file transfers
- ▲ Multiplatform support
- ▲ Multiprotocol support

Cons

- ▼ Not intended for use as a stand-alone product
- ▼ User interface paradigm confusing

Review,
continued from page 33

functionality impressed us.

While it is feasible that TransportIT could be used as a stand-alone product for enterprise file transfers, it relies on the underlying Unicenter infrastructure. The product will install the Unicenter framework if you don't already have it in place. We installed TransportIT on an NT server; while the setup procedure is wizard-based, prior knowledge of the Unicenter framework is necessary.

You must install three client agents on any machine that is to receive data. The three agents are standard and do not take up an unreasonable amount of disk space. You can add optional security agents to Windows 9X machines to ensure proper access to restricted files.

Once we were up and running, we ran the TransportIT administration client to set up a file transfer. The Explorer-like management interface lets you create transfers and their corresponding jobs. The transfer/job scheme is a bit confusing at first because much of the information contained in the two categories is redundant.

A transfer contains instructions about which files are to be copied and to whom they should be sent. You also set up the additional authentication mechanism for target and source computers within a transfer. You can design a transfer to send files to any combination of users or groups defined in the underlying Unicenter object database.

TransportIT jobs are used to initiate the defined transfers. Jobs can be sent in an ad hoc manner or via a sophisticated scheduling mechanism. The schedule can be set for a single instance, or for a recurring job with a predetermined expiration date. However, TransportIT is not intended for real-time replication.

TransportIT has a few management features that administrators will like. Most important, TransportIT has a checkpoint/restart facility. In case of a dropped or suspended transfer, this feature allows a job to resume where it left off. In addition, TransportIT has a "commit to disk" facility that flushes data from the client machine's cache in case of a system crash so the data is not lost.

Overall, TransportIT offers robust file copying for heterogeneous networks and operating systems. For large enterprises that are certain to have multiple operating systems and networking protocols, TransportIT's broad support is a major benefit. Unicenter has proven itself to be a dominant force for scalable enterprise systems management, and TransportIT is icing on the cake.

ScoreCard

TransportIT 1.0

Scalability 40%	9 x .40 = 3.60
Administrative interface 20%	6 x .20 = 1.20
Ease of use 20%	7 x .20 = 1.40
Installation 10%	7 x .10 = 0.70
Documentation 10%	5 x .10 = 0.50
Total score	7.40

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Goldberg is a contributing editor for Network World, *specializing in client/server systems management technologies. He can be reached at sgoldberg@pobox.com.*

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InstallShield taking software installation expertise to IT

BY JOHN FONTANA

Another player is gearing up to challenge the many obstacles to automatic software distribution success.

Last week, InstallShield Corp. jumped into the market with NetInstall, an enterprise version of its InstallShield utility that is popular with developers.

NetInstall, which is designed for Windows software distribution on LANs and WANs, provides a centralized point for creating application installation "packages" and delivering them to corporate desktops. With it, network administrators can manage and customize desktops from the NetInstall console.

But can InstallShield really make automatic software distribution work?

For years, net administrators have made do with products that are considered successful if they can perform correctly even half the time. Hassles have included having to write detailed scripts to deliver software, needing to support multitudes of heterogeneous desktops and complex implementations. But because there is recognized value in the automation of software distribution, products such as those from Epicon, Novadigm, Open Software Associates and Veritas Software, have proliferated.

"The software distribution market is filled with products and product failures, and that is the challenge InstallShield faces," says Matthew Nordan, an analyst with Forrester Research. "But the demand for these products remains huge."

Some say InstallShield's uninstall features will be its strength in the market. "Other vendors are lacking in this area, their technology is not as good," says Phillip Mendoza, an analyst with International Data Corp.

Network installer

NetInstall's features include application deployment over a network from a central location and desktop management. Here is a look at its other features.

Feature	Description
Manager	Creates, manages distribution process
Service	Loads applications without target desktop needing administrative privileges
SDM	Manages installation, start/stop of NetInstall
Monitor	Tracks installation progress on desktops
SMS AddOn	Integrates software with Microsoft's SMS

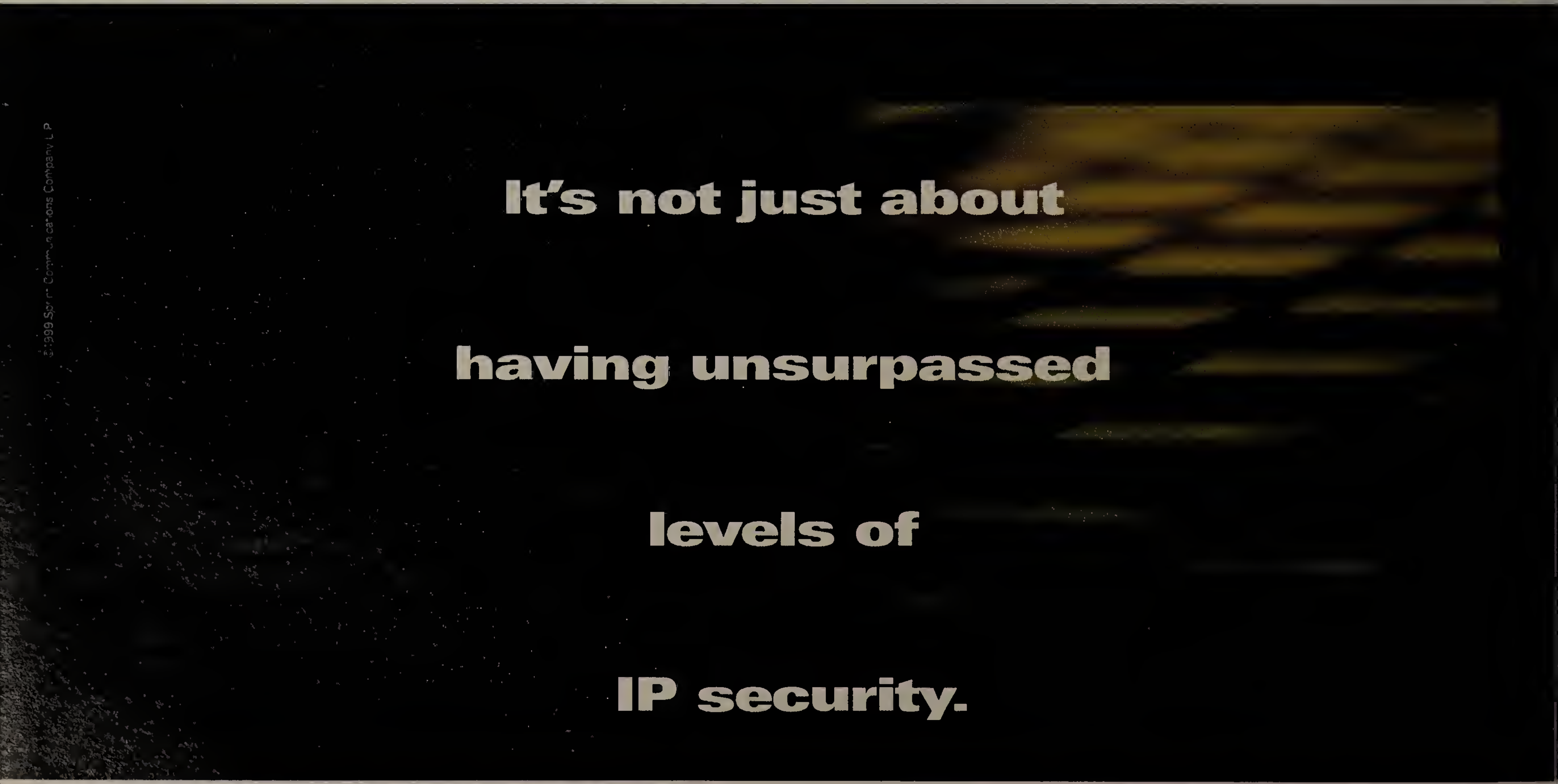
NetInstall, which runs from an administrator's workstation, features NetInstall Spy. The Spy software determines what files need to be installed on the target machine, updates the desktop's Registry and picks a location for storing application files.

Users create packages on a single workstation by taking a "snapshot" of the workstation's hard drive before installing and customizing an application on that machine. Once the install is complete, another snapshot is taken and the differences between the two are recorded. The differences are actually a record of the files needed to install the application. The record, or package, is then sent over the network to other desktops and automatically installed.

In addition to installations, NetInstall also can manage and customize desktop configurations. With NetInstall Manager, network administrators can manage local users and groups, set and audit desktop security, install and manage local and network printers, and lock-down desktops to prevent changes.

NetInstall's pricing starts at $875 for a 25-node license.

InstallShield: (888) 838-1163



Whether it's with your colleagues down the hall or those around the globe, sharing mission-critical data securely is imperative. As an industry leader in IP security, only Sprint offers end-to-end solutions that virtually eliminate both external Internet and internal network breaches. In addition, Sprint offers the most levels of managed security available,

'Net Insider . Scott Bradner

VARYING DEFINITIONS OF 'LOCAL'

In late February, the Federal Communications Commission decided that, at least for now, it was the states' responsibility to decide if and how local phone companies have to pay intermediate carriers for users' calls to their ISPs. We are now starting to see the result of letting the locals decide.

When you place a call to your dial-up ISP, you almost always do so through an incumbent local exchange carrier (ILEC), such as Bell Atlantic or US WEST. But sometimes the call is transferred to a competitive local exchange carrier (CLEC) for delivery to the ISP's location.

Even with an ILEC and CLEC involved, calls to the ISP are currently billed to the user as local calls because the ISP generally has a point of presence in the same community as the caller. Because most ISP users have selected a flat-rate local phone plan from their LEC, these calls are not charged by the minute.

The ILEC gets its money from the monthly flat-rate fee. The CLEC charges the ISP a monthly fee for the phone line. In addition, Congress ruled in 1936 that LECs are due some extra money, called "reciprocal compensation," when they take a call from another LEC and deliver it to a local customer. So if calls to ISPs are "local," then CLECs get extra money.

But now the FCC has sort of said that calls to ISPs are "largely interstate" and thus are not subject to the reciprocal compensation. So for now, the FCC is leaving the final determination to the states.

The FCC's decision (www.fcc.gov/Bureaus/Common_Carrier/Orders/1999/fcc99038.txt) is the normal nonterse result of an overregulated industry, comprising 27 pages and 110 footnotes. By letting each state do its thing, the report guarantees there will be considerable confusion in this area with states deciding things differently. But the FCC does serve notice that it is thinking of making a national rule to cover this situation.

If you use a dial-up ISP, you might want to take a look at the report, in particular Paragraph 29. The FCC acknowledges there should be some type of intercarrier compensation for ISP calls. The commission believes the compensation is "not likely to be based entirely on minute-of-use pricing structures."

"Entirely" is the operative word here. If this prediction holds, you will start getting per-minute bills from phone companies for your ISP use. It's only a matter of how badly, not if, you'll get hit.

There is at least one bright spot in all of this: Ameritech has proposed that any compensation be based on sharing the revenue for ISP-bound calls. Nah, that won't go anywhere — it's too logical.

Disclaimer: I suppose logic has a place at Harvard, though M.I.T. seems better for that. But the above is my own evaluation.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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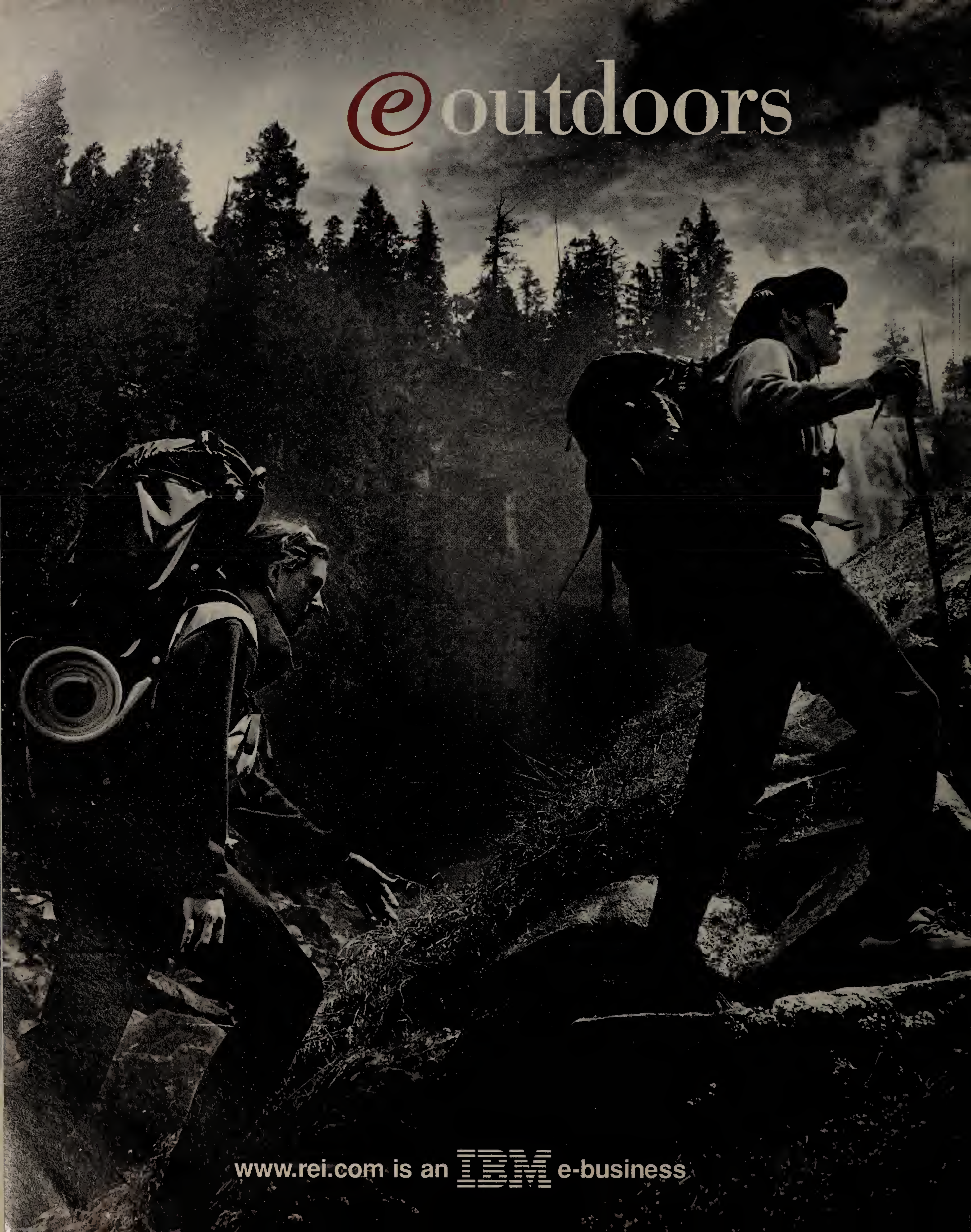
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IBM software is helping thousands of companies build, run and manage powerful interactive e-commerce Web sites. For REI, that means everything from state-of-the-wilderness gear you can buy to clinics on outdoor skills, enthusiast bulletin boards and a world of trips and tours. The scope of REI's offerings led them to IBM.

IBM software provides the building blocks for all facets of e-business, including secure payments, electronic catalogs, and order processing. For REI, proven products, such as Net.Commerce, DB2® Universal Database™ and IBM Firewall deliver the scalability, reliability and security it takes to reach, sell and service a growing community of outdoor enthusiasts.

The results have been nothing less than astonishing. In the first quarter alone, REI's sites generated online sales that exceeded projections by over 360%. And these e-sales are 4 times the size of those in their brick-and-mortar counterparts. Bottom line, REI is growing profits far beyond its wildest expectations.

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‘Rogue’ users rile IT professionals

USER SUPPORT

Most call unauthorized applications a costly plague.

BY PAUL MCNAMARA

They cling to Corel’s WordPerfect word processor, Lotus’ 1-2-3 spreadsheet or an esoteric messaging client such as Pegasus Mail long after their employers have standardized on something else, usually the Microsoft desktop.

They are “rogue” application users, and they are the bane of a network administrator’s existence, according to most — but surprisingly not all — IT professionals.

“The problem, in a nutshell, is not that rogue users want to use their rogue applications, the problem is that they want support from me for them,” says Jeremy Collins, a systems specialist with a Texas insurance company, summarizing the views of many administrators.

Maintaining unauthorized applications can cost an IT department dearly in terms of staff time, ad hoc training and distractions away from more pressing business matters, say critics of the rogues. In addition, rogue applications cause a slew of interoperability and security issues that their users may not know about.

According to Collins, honesty may not be the best policy when it comes to dealing with these users.

“It has to be made clear that you do not support anything other than the standard,” he says. “It’s also necessary to lie to the users to maintain this: You may know how to support WordPerfect and probably 90% of the other rogue applications, but never let on. If the users find out you do know, they will expect support.”

Most network administrators can cite a favorite rogue story or two, even if they do not consider the practice a significant issue in their shops.

“One we get all the time is people downloading Outlook [Microsoft’s e-mail client],” says Andrew Bell, network manager at Milltronics, in Peterborough, Ontario. “The default install for Outlook hoses the [company’s standard] GroupWise client.”

“I have one rogue user who often warns me of problems with our e-mail before anyone else notifies me. . . . I consider him a positive user.”

David Byrkit, e-mail administrator,
ITT Avionics, Clifton, N.J.

Fixing the problem the first time took hours and still takes 20 minutes a pop now, he adds.

As for antirogue measures, Bell’s company sticks to the basics.

“We find that a combination of regular software audits and policy [reinforcement] is quite effective,” he says. “We also make it very easy to purchase and install the standard applications — site licenses, configuration scripts, Novell Application Launcher, a ‘restore your laptop’ CD, etc. Users will normally take the path of least resistance — so I make it as easy as possible to access and use standard software.”

SHAWN HENRY

“Next thing you know, [rogue] users are bringing in their machines from home and asking us to make them Y2K compliant.”

Jerry Fain, IT manager, Winter, Wyman & Co., Waltham, Mass.

Other administrators report having had success “locking down” user desktops using the likes of ZENworks from Novell and Full Control from Bardon Data Systems in Albany, Calif.

Then there is the benign neglect method.

“If they use any unapproved software and then have a problem, they go to the bottom of the list — and stay there — until all problems are fixed on computers from users who follow company policy,” says Walter Fletcher, IS manager at Lipscom & Pitts Insurance in Memphis. “This means it could take a while . . . or we give them a slow 486/66 [PC] as a loaner — ouch!”

The risk of breeding security breaches is cited often by network managers who oppose rogue users.

“Our mail system does have virus checking, our rogues do not,” says Ray Pasley, supervisor of network services at Kansas City Power & Light Co.

While the flow of proprietary information out of the utility company can be monitored using the administration functions found in Microsoft Exchange, those controls are useless if rogue users deploy unauthorized e-mail clients, Pasley says.

“Rogue clients of any type need to be known before they can be set up to be monitored by external security,” he adds. “[With rogues] there is a much better chance for long-term leakage prior to discovery.”

While in the minority, there are administrators who see rogue users as more of a mixed blessing than a menace.

“I do have a few rogue users, but I have never felt they were a problem,” says David Byrkit, e-mail administrator at ITT Avionics in Clifton, N.J. He nonetheless discourages the practice by promising support only for Outlook.

Byrkit is among those administrators who see a positive aspect to the rogue phenomenon.

“I have one rogue user who often warns me of problems with our e-mail before anyone else notifies me and sometimes updates me on what is going on outside of my little ITT Avionics world,” he says. “I consider him a positive user and kid him that when I retire he will be stuck running the e-mail system.”

Another expert encourages an even more liberal stance.

“Any company that doesn’t allow rogues to exist has a real problem,” says Joel Snyder, senior partner with Opus One, a consulting firm in Tucson, Ariz. “They need to be tolerated and supported.”

Doing so requires network managers to take to heart that old adage about the customer being right, Snyder adds. “The IT staff is there to support the organization, not to control the organization,” he says.

Zero tolerance of unauthorized applications, however, is the far more common philosophy among network managers. “If we didn’t install it, we don’t support it,” says Jerry Fain, IT manager at Winter, Wyman & Co. in Waltham, Mass.

Fain is among those administrators who fear the slippery slope that can result from turning a blind eye to rogue applications.

“The next thing you know,” he says, “users are bringing in their machines from home and asking us to make them Y2K compliant.” ◪

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Delivering VPNs over high-speed DSL links

BY TOM MITCHELL

Digital subscriber line (DSL) service offerings are emerging as an attractive alternative to T-1 and frame relay for building virtual private networks (VPN).

Symmetric DSL (SDSL), for example, which operates over a single twisted copper pair, offers the same amount of bandwidth as T-1, at about half the price.

Before DSL, network professionals were confined to building VPNs over the Internet using IP tunneling, or over a carrier's leased line or frame relay services.

Now a new VPN option is entering the fray: ATM over DSL. The ADSL Forum's Technical Report TR-002 defines asymmetric DSL and ATM interworking. ATM was selected by the ADSL Forum as the Layer 2 protocol for ADSL because of its quality-of-service (QoS) support, the security it provides to users, and ATM's ability to support parallel sessions over a single DSL line. ATM over DSL lets users build secure, high-performance VPNs over a low-cost access technology.

ATM supports a rich QoS feature set and the extensive traffic-management capabilities needed to deliver high-quality VPNs over DSL. User-definable parameters, such as peak cell rate, sustainable cell rate, minimum cell rate and cell delay variation tolerance, let users define QoS for each application carried over a DSL-based VPN. This ensures optimal application performance.

The Service Network Architecture Group of the ADSL Forum is currently debating two options for an end-to-end Layer 2 architecture for DSL nets: packet-mode for the native delivery of IP and ATM, and regular IP delivery. IP, which is still developing QoS capabilities such as Differentiated Services, a proposed IETF standard, does not appear to be a viable option for QoS. While IP can perform some class-based QoS, which maps multiple traffic flows into a few service categories, IP does not support customizable, user-definable QoS for individual applications such as voice and video. With IP, users can't modify the class of service (CoS) to fit the unique performance characteristics of the application.

ATM's ability to provide QoS for multiple virtual circuits to each location in a VPN allows for the provision of delay-sensitive applications, such as voice and video, over the same DSL link that carries data traffic.

Integrated access devices (IAD) with DSL interfaces multiplex voice and data traffic streams into ATM virtual circuits for transmission over a DSL line. Ensuring QoS for multiple virtual circuits on a DSL local loop requires the central office DSL access system and the IAD to support the constant bit rate (CBR) and variable bit rate (VBR) ATM CoSes.

While most DSL modems support these CoSes, many DSL access multiplexers in central offices support only the unspecified bit rate (UBR) CoS. UBR connections receive only best-effort service and lack QoS guarantees that control transmission characteristics such as cell loss. If there is no bandwidth available to transport UBR cells, they are discarded.

Before building a DSL VPN, users must verify that their DSL service provider supports multiple virtual circuits over a DSL local loop, and that multiple CoSes — CBR, VBR and UBR — are supported. With multiple CoSes, voice virtual circuits can be configured as either CBR or VBR real-time connections, with limited cell loss and transit delay, in order to guarantee voice quality.

Depending on the service level required, data virtual circuits can be configured as CBR, VBR or UBR connections and share the same DSL line with voice calls. Because virtual circuits carrying voice calls receive a higher priority for bandwidth, the data connections on the same line do not interfere with voice quality.

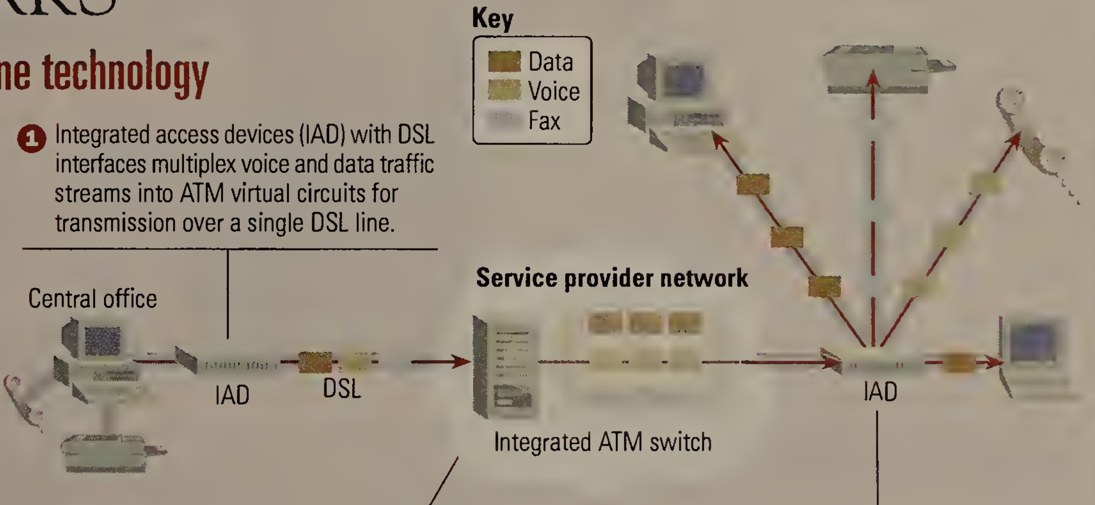
For telecommuters, network professionals can take advantage of PPP over ATM. RFC 2364, the IETF's recommendation, describes the use of ATM Adaptation Layer 5 for framing PPP-encapsulated packets. PPP over ATM is becoming the most common service architecture for remote access over DSL and is serving as the baseline for vendor interoperability.

Mitchell is director of product management at Promatory Communications, a broadband access system provider in Fremont, Calif. He can be reached at tmitchell@promatory.com or (510) 413-4864.

HOW IT WORKS

ATM and digital subscriber line technology

The ADSL Forum defines how ADSL and ATM should be interworked in large-scale networks with many remote users. ATM was selected by the ADSL Forum as the Layer 2 protocol for ADSL because of its QoS support, security and ability to support parallel sessions over a single DSL line. Because ATM can provide QoS for multiple virtual channels to each location in a VPN, it is possible to provision delay-sensitive applications, such as voice and video, over the same DSL link that carries data traffic.



① Integrated access devices (IAD) with DSL interfaces multiplex voice and data traffic streams into ATM virtual circuits for transmission over a single DSL line.

② Integrated DSL/ATM switch using ATM's CBR and VBR ATM classes of service transport voice data and video across the WAN.

③ Voice, data and video packets delivered securely to proper destination by local IAD.

Ask Dr. Intranet

By Steve Blass

I've just been thrown into the position of proposing an intranet setup, and I'm trying to find resources for Gigabit Ethernet over fiber and copper. I realize the technology is new, but I would like to go with Gigabit Ethernet over copper if possible.
Sal Khan, Cadmus-Mack Printing Group, Easton, Pa.

A good place for an overview of the technology and evolving standards development is the Gigabit Ethernet Alliance Web site at www.gigabit-ethernet.org/technology/whitepapers/index.html. There you'll find a description of the IEEE 802.3ab Task Force's plans for supporting Gigabit Ethernet-over-Category 5 copper cabling. Another good site is offered by the University of New Hampshire's InterOperability Lab at www.iol.unh.edu/training/ge.html. You can also search Network World Fusion at www.nwfusion.com for stories and information.

Also, most network equipment vendors' Web pages provide information about Gigabit Ethernet offerings and plans for implementing Gigabit Ethernet over copper. Some vendors already offer products for Gigabit Ethernet over copper, although the standard isn't likely to be ratified until September.

If you decide to use Gigabit Ethernet over copper, make sure your cable plant is up to Category 5 standards. It's crucial to test this; 1000Base-T will not forgive sloppy connections or substandard cabling.

As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send your problems to dr.intranet@paranet.com.

Gearhead — inside the network machine . **Mark Gibbs**

A HIGH-LEVEL LANGUAGE WORTHY OF YOUR TOOL KIT

> **python** 1. any of a genus of large, nonpoisonous snakes of Asia, Africa and Australia that crush their prey to death. . . . 3. totally awesome, bitchin' language that will someday crush the $'s out of certain other so-called VHLL's ;-)
>
> —Guido van Rossum from the
> Python Web site
> (www.python.org/doc/
> Summary.html)

This week, Gearhead looks at a way-cool programming language called Python. "Not another language!" Gearhead hears you cry. "Why should we care about Python?"

The answer is Python is easy to learn, efficient, stable, elegant and available on a significant number of platforms. It also offers a substantial reduction in development time compared to C, C++ or even Java. And finally, the cachet of being able to program in Python may be useful at parties ("Hey, ever heard of Python?" . . . well, maybe not).

The language is the creation of a Dutchman, one Guido van Rossum, and the language's name is somehow related to the fact that Guido's favorite comedy show at the time Python was developed (around 1990) was *Monty Python's Flying Circus.*

Python is a very high-level language (VHLL) that supports object-oriented programming. It is similar to Perl and Tcl (which we will cover in a future "Gearhead" column) and has gained a loyal following. Better yet, its open source development has been aggressively continued — on April 13, van Rossum released Python Version 1.5.2.

As noted, Python is portable and has been implemented on Amiga, BeOS, QNX, VMS, Windows CE, Psion, Linux, Sun Solaris, SGI IRIX, DEC Unix, IBM AIX, HP-UX, SCO, NeXT, BSD, FreeBSD, NetBSD and Windows. And better still, the source code to the language is freely available under the GNU license, which means that you can modify it as you see fit.

The language has some important features, least of which is the indenting of source statements that makes source code easier to read (Gearhead has often opined that source code that looks good tends, more often than not, to be good). Python can be extended with C, uses automatic memory management, interfaces with operating system libraries, performs system calls and executes quickly (although, as always, if you want raw speed, scripted languages aren't the way to go).

Python can be used as a scripting language for browsers (with a plug-in) and Web server applications, including Microsoft's Active Server Page (ASP) technology (see "Gearhead," *NW*, April 12, page 36). And as proof, it can be used for real-world applications: The scoreboard system for the Melbourne (Australia) Cricket Ground and Zope, a terrific Web application server, are both written in Python.

All Python programs are called modules. Modules can be imported (Pythonese for "used") by other modules and can be reloaded dynamically so changes in source code can be made and effected during execution.

Python comes with a slew of modules that provide systems services, graphics and math functions, as well as file and network input/output support. Also included are open source programs that implement Web servers, editors, databases and other useful functions.

Strictly speaking, Python is a compiled language in the same manner that, say, Java is compiled: On execution, the Python source code is parsed and a "byte code" version is produced. The byte code is a platform-independent program that is, in turn, interpreted by the Python run-time system.

While Python and Java share some attributes, Java is far more rigorous in its security model and far richer in terms of interface and function libraries. On the other hand, a Python program will usually execute faster than a Java program and the language is easier to learn.

Python is an incredibly useful gizmo to have in your tool box, and the price is right. Python gets a Gearhead rating of a full five gear teeth out of five.

Code to gh@gibbs.com.

News, tips and tools from our Web site

Rogue users

In recent weeks, Joel Snyder, author of our messaging newsletter, has written several pieces on rogue users — end users who insist on installing their own software, no matter how many times you tell them not to. A forum on the topic has sparked a fair amount of comment.

Some IS managers do everything they can to get the rogues back in line. But others argue that end users are the customers, and, well, customers are (almost) always right: "Too many IT workers have the mindset that they are employed to serve the needs of the machines. . . . In a modern business, that mindset needs to be expunged in favor of a more holistic approach."

What do you think?

DocFinder: 3143

Directory forum

Our story last week on what users of Microsoft's impending Active Directory could learn from people who already use Novell Directory Services also generated comments, although to be honest, they mostly seem to be from NDS backers warning their Microsoft counterparts to run away. Any NT users out there looking forward to Active Directory?

DocFinder: 3331

NT modem speed

Help Desk editor Ron Nutter this week helps a user whose NT box isn't up to speed. He can't get his 56K bit/sec modem to connect at speeds faster than 28.8K bit/sec. See what Nutter suggests.

DocFinder: 3328

Load-balancer RFPs

It's time this week for our load-balancer review and Buyer's Guide. This contains vital information if you're running a large Web shop, of course. In addition to the online features you expect (like the interactive Buyer's Guide that lets you find a load balancer that meets your criteria, or compare two or more models on various features), we've posted a sample request for proposal for the beasts. Written by The Tolly Group, it's a good template to use as you begin to solicit information and bids on these increasingly important (and expensive) Web modules.

DocFinder: 3323

New newsletters

This week and next, we expand our series of free Network World Fusion Focus e-mail newsletters with three new ones:

- **VPNs** — Everybody seems to be jumping on the virtual private network bandwagon. *Network World* Senior Editor Tim Greene will help separate the wheat from the chaff in this twice-weekly newsletter.
- **Voices of Networking** — *Network World* and Network World Fusion have the best stable of commentators on networking (in our humble opinion, of course!). Keep up with them in this weekly digest of who's saying what (and where to read more).
- **Tech Update** — In a field where everything seems to be changing, this weekly newsletter will help you stay current. Associate News Editor Michael Cooney will give updates on new technologies, with links to more information.

DocFinder: 3332

Help Desk

Ron Nutter is standing by to answer your networking questions. Read his column every week on Fusion. DocFinder: 2450

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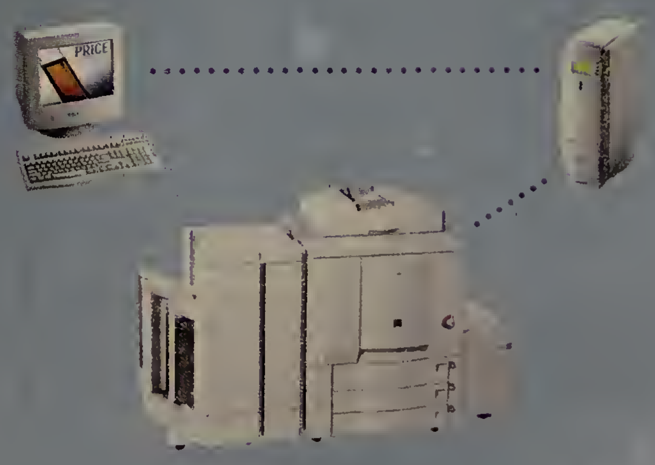

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Editorial Insights

Convergence: Why I'm buying it this time around

Having seen the voice/data integration hype sweep through the industry in the early 1980s and never amount to anything, I've been skeptical about the current convergence hysteria. After all, the promised advances are the same: new applications and economies; an end to parallel networks; and new, simplified network administration and management.

But it never happened. Why? Because it was simpler and easier to run parallel nets. Applications that could take advantage of convergence were not very compelling. And the economics of convergence never materialized.

So what has changed?

- The Internet has arrived and with it, a universal protocol and a universal client. This new infrastructure eliminates the proprietary problems that hobbled earlier efforts.
- Everything is digital. Regardless of your voice/data traffic mix, the fact that it is all digital today removes an integration obstacle.
- Bandwidth economics have changed. Local bandwidth is virtually free, and wide area is cheap and getting cheaper. Compare that to 15 years ago when 10M bit/sec worth of shared bandwidth was the norm in the local area, and T-1s were a novel concept on the WAN front.
- The players are different. Once it was a pack of renegade PBX suppliers. Now it's the PBX vendors, the telco switch suppliers, feisty router folks and even the carriers themselves.

Skeptic that I am, I'm beginning to buy it. But it will happen much more gradually than some (read Cisco) would have you believe. Large shops are paying peanuts for voice today, and it will take a lot to convince them to change.

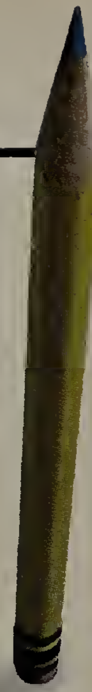
Instead, convergence will creep into the enterprise to address specific problems. For example, using the Internet and voice over IP to support small overseas shops; using the technology to help integrate disparate voice systems in companies that merge; or rolling out a converged application for a specific sector of employees, such as teleworkers.

And convergence will creep in from the carrier side. They will begin using converged facilities, then come knocking on your door with pitches reminiscent of that old dishwashing detergent ad: "You're already soaking in it. Why not adopt it directly?"

So while I believe it will actually amount to something this time around, I don't expect widespread use of converged technology until the middle of the next decade.

— *John Dix*
Editor
jdix@nww.com

Message Queue



CHECK THE HARDWARE

Regarding the letter "Still going" (May 17, page 40):

I read stories all the time about how one operating system works better than another. I hear about how network operating system (NOS) vendors and advocates piddle back and forth about how their competitors' products are buggy, defective and just plain stink.

I have worked with many different NOSes, including Windows NT and NetWare. All these operating systems have pros and cons, but one thing always seems to escape the critics — hardware. If the hardware is crap, the NOS is going to act like crap. If the hardware is defective, the NOS will be defective.

Hardware vendors like to blame oddball problems on the software installed. In some cases, installed software can interfere with other functions of the NOS. When software is installed, Dynamic Link Libraries, NetWare Loadable Modules and other modules are replaced. In some cases, hardware fails. What we need to remember is that hardware is a breakable commodity. Do you always blame the gas in your car if it breaks down? What about the oil? No, we look at the engine or some other part. The same analogy works here.

The fact is, most administrators and technicians I have worked with do not thoroughly troubleshoot a problem; instead, they try to blame everything on software. Working as a technical support specialist and network administrator, I have a NetWare 3.12 server that has been continually running for three months. I took it down to move cabling at one point, and before that it ran for six months without a hiccup. When I had errors or slow performance, I looked at the hardware and didn't simply reinstall NetWare just to see what would happen. The best troubleshooting tools are reading documentation, remembering what you did and taking everything one step at a time — not to mention common sense.

Richard Tocci
Technical support and lab administrator
AMS, Inc.
College Station, Texas

Send letters to nwnews@nww.com or John Gallant, editorial director, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

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DOG DAYS

Regarding Mark Gibbs' "Backspin" column "Give me a net-enabled dog groomer" (May 24, page 70):

That's all we need, Web-enabled appliances. Can you imagine all the fun hackers would have? Forget breaking in to NASA (which seems to be child's play, anyway) when one can turn an entire household into chaos and gleefully watch from across the street. All because someone thought it would be fun to scare the daylights out of neighbor Mark's black lab by making the electronic dog-polisher rev its .35-horsepower motor at 3 a.m.

James David Dykas
Supervisor, technical services
Universal Weather and Aviation
Houston

HANDS OFF MY FRIDGE

Mark Gibbs has been blinded by technology. Just because something can be done, doesn't mean it should be ("The household appliance of science," May 31, page 66).

My refrigerator does one thing, and it does it reliably. It keeps things cold. The Internet cannot make the fridge more reliable, colder or cheaper.

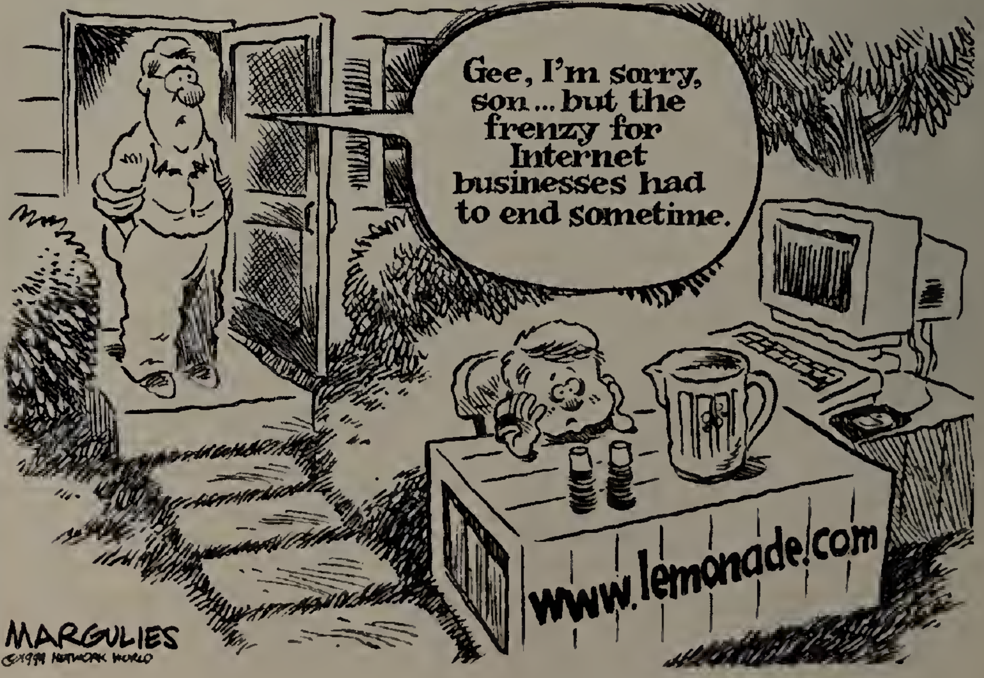
Gibbs mentions that his new Pentium III PC freezes once a day. Suppose your Internet-enabled refrigerator thawed once a day?

Gibbs says: ". . . should the fridge detect any deviation from normal operation, it will . . . inform the manufacturer." And then what? They'll send a repairman? He'll still have to talk to you on the phone to find out when his schedule and your schedule coincide. Meanwhile, your food is spoiling. How has the Internet prevented this?

The Internet is principally a communications medium connecting two or more human minds. Man will always be pushing it to its limits and straining its reliability.

Some things don't need to be intelligent and flexible, they just need to be reliable.

William A. Lynn
Virginia Beach, Va.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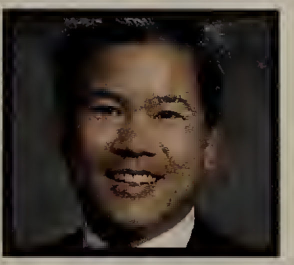
Venture Over the Horizon . Kevin Fong

CONSOLIDATION SHOULD NOT MEAN LESS CHOICE

AT&T's recent $100 billion gamble on cable, which includes not only its $54 billion offer for MediaOne but also its earlier acquisition of Tele-Communications, Inc., has raised some significant questions about the future of telecommunications. These acquisitions give AT&T control of cable systems that currently reach 60% of U.S. households. Will this transform the carrier from a telecom laggard into the powerhouse it once was? Will AT&T come to dominate the communications infrastructure of the future the way it held the infrastructure of the past in an iron grip?

The answer to both questions is a definite "No." The world today is very different than it was in 1984. The growth of the Internet, the maturation of the cable infrastructure, the rise of competitive local exchange carriers and the potential for data broadcasting will make it difficult for one or even a few companies to dominate this new landscape. Assuming AT&T manages to get back into providing local services via its cable pipes, the company will still have to contend with regional Bell operating companies, which are also in the midst of bulking up with acquisitions and partnerships. Then there is Microsoft, which has the cash and wants to have a major say in how services are delivered to set-tops.



I suspect more than a few consumers would love to see a return to the days when one company provided all their voice and data services, when one easy-to-read single-page bill was all that arrived in the mail each month. Even network managers might find the notion of one supplier attractive.

This nostalgia is misplaced. It is choice and competition, not manageability and simplicity, that have brought us the relatively inexpensive array of services we enjoy today. Prior to 1984, the amortization schedule for AT&T's equipment was something like 20 years. Today, equipment — and the new services it provides — turns over in less than five years. The accelerated pace of innovation has brought us fiber, more Internet bandwidth and a lot of handy services, such as residential voice mail, caller ID, call following and e-mail, to name a few.

There are, of course, trade-offs. By having competition and choice, consumers, small businesses and large enterprises have to be willing to take on the burden of managing their own telecom needs. I also believe that the federal government needs to seriously rethink its telecom policies to take into account the convergence of voice and data networks so everyone is free to choose which companies will provide different services. Although AT&T owns my cable system and offers Internet access and phone service over cable, I should still be able to choose my own Internet or telephony provider.

Competition and choice are the legacy we have carried forward from 1984. There is no turning back.

Fong is a general partner of Mayfield Fund, a venture capital firm in Menlo Park, Calif. He can be reached at kfong@mayfield.com.

Reality Check . Thomas Nolle

DWDM COMES IN LIKE A LION, OUT LIKE A LAMBDA

It's rare that vendors, experts and the press concur on something, but they all agree that dense wave division multiplexing (DWDM) is the way of the future. If it is, though, a lot of other so-called revolutionary technologies are going to fall flat on their faces.

DWDM is an optical technique for creating parallel information paths on a fiber strand by separating the information by the wavelength of the light used to carry it. Each wavelength, the electrical symbol for which is lambda, can carry as much as an entire old-generation SONET fiber used to carry. Today's technology can support up to about 64 lambdas on a fiber; we may see 1,000 or more lambdas per fiber within five years.

Initially, most of the attention given to DWDM focused on its ability to multiply fiber capacity. You can support 96 gigabits of information on a SONET OC-192. If each lambda on the same fiber carried that payload of information, you'd have terabits of capacity. Recently, however, vendors such as Monterey Networks and Sycamore have introduced a new wrinkle called optical networking, and it's this new concept that threatens many other network technologies.

Optical networking works by what could be called "lambda hopping." With standard SONET or DWDM, each fiber is terminated in a big switch, router or optical cross-connect. Information paths must be interconnected with electrical devices at each fiber junction, and huge fiber capacity would mean huge switch/router products inside the optical core. With lambda hopping, information moves from fiber to fiber by jumping from "Lambda A" on the first fiber to "Lambda B" on the second, and so forth.

What's significant is the gear that makes these lambda-hopped connections: an ordinary optical laser and detector and an inexpensive electrical bridge. The contents of a lambda are switched from strand to strand at a very low cost, without terabit products to build the bridges. By using lambda hopping, a kind of optical virtual circuit can be built across the optical core.

DWDM makes it possible to spread the optical edge of the network — the place where the last, deepest, switch/router is needed — outward toward the users. As that happens, we find more devices in the network at that level. The more devices at a given place in the network, the more devices share the total traffic — which means less traffic per device. Thus, terabit products become less useful. We'll probably never see any more than a few supercapacity switch/routers in the deep core because the deep core will be built with inexpensive lambda-hop components.

What holds us back in this evolution of DWDM is the break-even point between optical and electrical multiplexing. Right now, it's cost-effective to do DWDM at OC-48 levels, so we can push optical cores outward toward the user to the point at which we can't collect an OC-48's worth of traffic.

Currently, that's not very far. But as traffic in the network increases with the growth of data applications and improvements in optical networking reduce the cost of DWDM, we can expect to see a lot more optics and a lot fewer electronics in the networks.

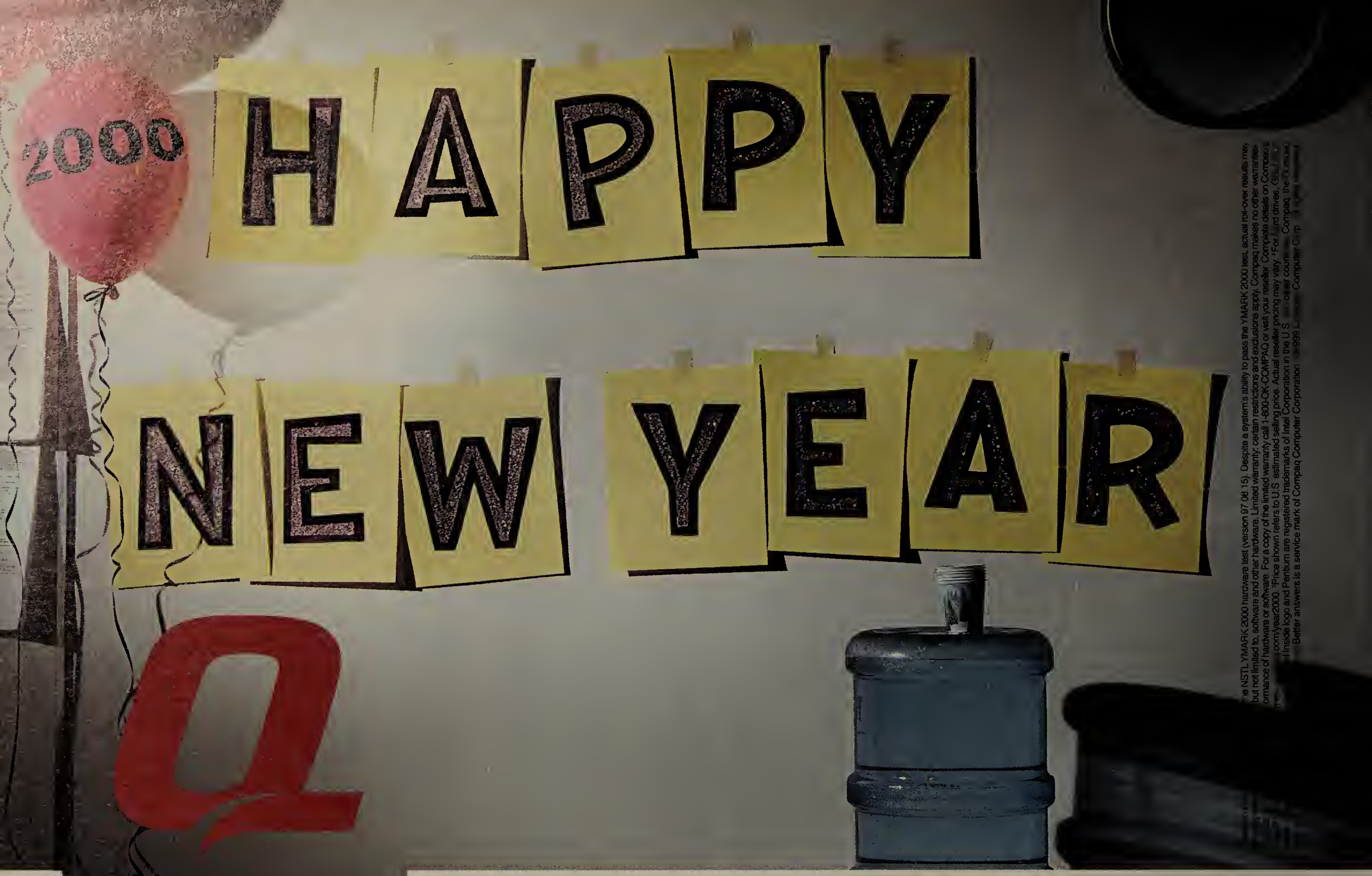
There's more at stake than terabit routers. The whole IP/ATM convergence debate becomes irrelevant if we can make DWDM so inexpensive and effective that different network protocols can be multiplexed together at the lambda level. There's no advantage to changing equipment or making compromises in features to converge on one protocol if the network can support any set of protocols at the optical level with equal efficiency.

Cisco was smart to drop its big ATM switch; DWDM will make terabit switches and routers dinosaurs. Moreover, Cisco's investment in Monterey Networks, a DWDM network player, proves the company understands the direction of the market. Other players with big electrical-layer box plans will have to sell out to an unwary telecom giant or focus on the real problem: the optical-electrical boundary.

We can't push lambdas to everyone's doorstep, so we have to construct service networks by combining electrical and optical technologies. The boundary between these two different network strategies is where the features of our networks will have to be created.

A dumb optical core can't provide phone service, Internet service or any other service. Smart electrical devices will have to absorb the service-feature mission of all our network services, present and future. It will take a new architecture to accomplish that. That's what we should be looking to electrical and optical switching vendors to provide.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (856) 753-0004 or tnolle@cimicorp.com



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Buyer's Guide

BALANCING ACT

BY MARK HOOVER

Don't be swayed by fancy features when a fast, scalable load balancer should be your top priority.

A load balancer handles Web site traffic much like a maitre d' spreads customers around so the waitstaff doesn't burn out. No restaurant or Web site wants visitors to leave because service is too slow.

When a load balancer is in place, Web clients connect to a virtual Web site. The load balancer distributes user requests to multiple servers based on traffic volume and server availability. Many of today's load-balancing products also provide content-based balancing, which allows Web administrators to match traffic to server power by designating a large, fast disk array for image content and a fast and secure server for Secure Sockets Layer (SSL) and electronic commerce transactions. Some load balancers can perform trickier maneuvers, such as isolating Common Gateway Interface requests and sending them to a separate server or prioritizing SSL traffic over HTML traffic.

FRANK FRISARI

Sophisticated load balancers can operate globally, managing traffic among multiple, geographically dispersed sites. Global load balancing ensures that content and applications are quickly and cost-effectively made available to far-flung users.

Today, server load-balancing products are available from many sources. We polled 16 vendors and compiled specifications for more than 25 load-balancing products in our interactive Buyer's Guide (www.nwfusion.com, DocFinder: 3323). Browse our customizable database, and you'll find established companies and start-ups sharing the market.

A few of the big names in this market are Cisco, Microsoft and IBM. But we've found that a cadre of smaller, more focused start-ups — including Alteon WebSystems, ArrowPoint Communications, Coyote Point, F5 Networks, HydraWeb Technologies, IPivot, Radware and Resonate — tend to innovate a lot faster and often provide more comprehensive technical support because load balancing is their mainstay.

If you're in the market for a Web server load balancer, start by characterizing the nature of your site:

- First, determine your application requirements, which will determine the type of persistency policies you need. In the Web server world, persistence means a repeat user is connected to a Web server that is aware of that user's previous requests and account status. For example, if a user browses a site and places items in a shopping cart during one visit and then returns to the site to execute the purchase, the load balancer needs to connect that user to a server that remembers the items placed on hold.
- Determine the scale you need now and estimate the scale you expect to need in two years based on hits per second, number of simultaneous users and bandwidth requirements. Make sure you take into account the maximum capacity of other key elements of your system, such as WAN link size, database server capacity and application server capacity.
- Consider your application architecture. Is it two-tier or N-tier, with different levels of transaction processing at each tier? Do you plan to migrate over time? These answers will affect your monitoring requirements: The more complex your transactions are, the more refined your monitoring features should be to pinpoint bottlenecks.

A final design requires much more information. But addressing these factors will give you a good foundation and help narrow your list of alternatives. You can then use more detailed information to make good choices about the performance, scalability, redundancy and management features you desire. To get your wish-list of features started, check out the story, "What you need to know before you buy," on page 54.

Hoover is the president of Acuitive, a network consultancy specializing in IP-related services and network management and operations. He can be reached at hoov@acuitive.com.

Acuitive has published two research reports on server load balancing and traffic management: "Virtual Resource Management: Key Technologies, Tricks of the Trade and Application Requirements" and "Virtual Resource Management: Which Vendor is Right For You?" For information about these publications, visit www.acuitive.com.

Inside

Review: **In our tests of nine load-balancing products, Resonate's Central Dispatch software won the Blue Ribbon Award for its top speeds and simple operation. Page 50.**

What you need to know before you buy: **Find out which management and failover features every load balancer must have, and get the scoop on the extras. Page 54.**

Online

Interactive Buyer's Guide: **Use our customizable tools to compare more than 25 load-balancing products from 16 vendors. www.nwfusion.com, DocFinder: 3323.**

Allot Communications
Alteon WebSystems
ArrowPoint Communications
Cintel
Cisco
Coyote Point
F5 Networks
Foundry Networks
HolonTech
HydraWeb Technologies
IBM
IPivot
Microsoft
Phobos
Radware
Resonate

PERFORMANCE SOARS, FEATURES VARY

BY PAUL ANDERSON
AND GAIL JAMES

NetworkWorld REVIEW

When bottlenecks knock your Web server on its back, you have three choices: Replace it with high-end hardware and hope the server is fast enough to handle the load; distribute your content to several smaller sites, each with its own Web server; or balance the traffic load across multiple mirrored servers. For most organizations, load balancing is the clear choice.

All nine products we tested improved Web server performance significantly, making it tough to select a single winner. But in the end, the fastest product under the greatest load, Resonate's Central Dispatch, won our Blue Ribbon Award. In addition to setting the bar for performance, Central Dispatch Version 2.2.1b is easy to install and manage. However, we'd like to see Resonate beef up the product's security features, which don't include Network Address Translation (NAT).

In second place, Radware's Web Server Director Pro+ is the most scalable and feature-rich of the products we tested. It, too, was easy to configure and performed well.

While all performed well, security and scalability features distinguished Web server load-balancing products in our hands-on tests.

Placing just behind these two is Alteon's ACEdirector 2 switch. We appreciated ACEdirector's Layer 3 switching and NAT capabilities, but Alteon needs to add global load balancing to the mix.

Strong security distinguishes F5 Networks' Big/ip High Availability+ Single Controller 2.0.1. This Unix-based device works great as a router and includes an extensive packet filter. Unfortunately, Big/ip offers limited tools for monitoring Web servers and provides no trending data.

If you're looking for a basic Web server load balancer that won't require much training, Coyote Point's Equalizer E250 may be just what you need. It's easy to install and manage, though you won't find many advanced features and its interface is a little plain.

HolonTech's HyperFlow 2 does everything reasonably well, but needs refining. Documentation errors hurt its score in this review.

One of the three fastest load balancers we tested, IBM's WebSphere Performance Pack, is scalable and secure, and sports a polished X Windows graphical user interface (GUI). However, like Resonate, WebSphere lacks the added security that NAT provides.

Product: Central Dispatch 2.2.1b
Vendor: Resonate

NetworkWorld Blue Ribbon

High performance, strong management and easy installation earn a Blue Ribbon for Resonate's Central Dispatch.

HydraWeb's Hydra5000 offers strong performance and tight security, but the product lacks a GUI and Web browser interface.

Finally, IPivot's Intelligent Broker 4000 has a lot of useful features, but it lacks the polish of the leaders.

Though the load-balancing products we tested are as diverse as the vendors that designed them, we found they fall into three basic product types:

- Load-balancing software, which includes Resonate's Central Dispatch for Sun and Windows NT, and IBM's WebSphere for Sun, NT and AIX.
- Dedicated router-based devices, which include Radware's Web Server Director, F5's Big/ip, Coyote Point's Equalizer, HydraWeb's Hydra5000 and IPivot's Intelligent Broker 4000.
- Switch-based load balancers, which include Alteon's ACEdirector 2 and HolonTech's HyperFlow 2.

No one product type fared better than another in our tests. In fact, there's one of each type in the top three finishers.

Share the burden

Performance is a key feature to look for in a load balancer. Our performance tests were not designed to stress the products to their breaking points. Rather, we set out to compare the efficiency of the nine load balancers and show the improvements you can expect to see when you add a load balancer to your site.

In our tests, the nine load balancers significantly improved Web site performance. Surprisingly, F5's Big/ip improved pages-served performance by 55%, even when our test bed contained just a single Web server, suggesting that Big/ip also improved the flow of connections to the servers.

Load-balancing throughput improvement

All nine load balancers significantly boosted Web server performance. Our baseline for 60 clients sending requests to one Web server with no load balancer was 20 page/sec.

	(Page/sec) One Web server	Two Web servers	Three Web servers
Resonate's Central Dispatch	19	45	86
F5 Networks' Big/ip	31	53	73
IBM's WebSphere Performance Pack	19	45	72
HydraWeb's Hydra5000	20	60	68
Radware's Web Server Director Pro+	19	40	63
Alteon's ACEdirector 2	19	39	63
HolonTech's HyperFlow 2	20	40	62
IPivot's Intelligent Broker 4000	19	41	61
Coyote Point's Equalizer E250	22	42	57

ScoreCard	Performance 25%	Scalability 20%	Management 20%	Security 15%	Installation 10%	Documentation and online help 10%	Total score
Resonate's Central Dispatch 2.2.1b	10 x .25 = 2.50	8 x .20 = 1.60	8 x .20 = 1.60	6 x .15 = 0.90	9 x .10 = 0.90	9 x .10 = 0.90	8.40
Radware's Web Server Director Pro+	9 x .25 = 2.25	10 x .20 = 2.00	7 x .20 = 1.40	6 x .15 = 0.90	7 x .10 = 0.70	9 x .10 = 0.90	8.15
Alteon's ACEdirector 2	9 x .25 = 2.25	6 x .20 = 1.20	8 x .20 = 1.60	7 x .15 = 1.05	9 x .10 = 0.90	10 x .10 = 1.00	8.00
F5 Networks' Big/ip	9 x .25 = 2.25	7 x .20 = 1.40	7 x .20 = 1.40	10 x .15 = 1.50	6 x .10 = 0.60	8 x .10 = 0.80	7.95
Coyote Point's Equalizer E250	8 x .25 = 2.00	6 x .20 = 1.20	8 x .20 = 1.60	8 x .15 = 1.20	9 x .10 = 0.90	9 x .10 = 0.90	7.80
HolonTech's HyperFlow 2	9 x .25 = 2.25	7 x .20 = 1.40	7 x .20 = 1.40	8 x .15 = 1.20	7 x .10 = 0.70	6 x .10 = 0.60	7.55
IBM's WebSphere Performance Pack	9 x .25 = 2.25	8 x .20 = 1.60	7 x .20 = 1.40	6 x .15 = 0.90	6 x .10 = 0.60	7 x .10 = 0.70	7.45
HydraWeb's Hydra5000	9 x .25 = 2.25	9 x .20 = 1.80	6 x .20 = 1.20	8 x .15 = 1.20	5 x .10 = 0.50	5 x .10 = 0.50	7.45
IPivot's Intelligent Broker 4000	9 x .25 = 2.25	8 x .20 = 1.60	6 x .20 = 1.20	6 x .15 = 0.90	6 x .10 = 0.60	5 x .10 = 0.50	7.05

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

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Net Results

NetworkWorld Blue Ribbon **Central Dispatch 2.2.1b** Resonate (408) 548-5500 www.resonate.com/products/cd_ani.html $10,000 base price for two servers	**Pros** Strong performance Easy installation Good management	**Con** Lacks Network Address Translation
Web Server Director Pro+ Radware (888) 234-5763 www.radware.com/www/prospect1.htm $15,280	**Pros** Feature rich Very scalable Competitive performance	**Con** Weaker security in server mode than in router mode
ACEdirector 2 Alteon WebSystems (408) 360-5500 www.alteon.com/products/index.cgi=product.html $10,995	**Pros** Competitive performance Easy installation	**Cons** Lacks remote Web site balancing Weak server statistics
Big/ip High Availability+ Single Controller 2.0.1 F5 Networks (888) 882-4447 ww.f5.com/bigip/index.html $24,990	**Pros** Strong security Good performance	**Cons** Limited monitoring tools No trending data
Equalizer E250 Coyote Point Systems (650) 969-6000 www.coyotepoint.com/cp_products.html $3,995, plus $2,495 for optional Envoy distributed load-balancing software	**Pros** Simple installation and management Competitive performance	**Cons** Lacks advanced features Plain interface
HyperFlow 2 HolonTech (888) 380-6100 www.holontech.com $15,295	**Pro** Competitive performance	**Cons** Minor documentation errors Lacks remote Web site balancing
WebSphere Performance Pack IBM (800) 426-4968 www.software.ibm.com/webservers/perfpack/index.html $7,449	**Pros** Strong performance Polished X Windows GUI	**Con** Lacks Network Address Translation
Hydra5000 HydraWeb Technologies (212) 809-5900 www.hydraweb.com/z2_5000data.html $25,000	**Pros** Strong performance Scalable Lets you manage specific page types	**Cons** No GUI management application Lengthy installation
Intelligent Broker 4000 IPivot (619) 679-7858 www.ipivot.com $14,995	**Pro** Competitive performance	**Cons** Limited documentation Tricky installation

With two Web servers, HydraWeb's Hydra5000 was the performance leader, providing a 200% throughput increase over a single Web server without load balancing.

With three Web servers, Resonate's Central Dispatch led the field, providing a 330% throughput improvement. Even the slowest performer, Coyote Point's Equalizer E250, boosted Web page delivery 185% to 57 page/sec. The average speed gain for all the load balancers tested was a 236% increase.

For scalability, we evaluated each product's ability to handle a large server farm directly connected to the load balancer, as well as the product's ability to dynamically test a remote Web site and connect a user to it if that site would be the best performer for that user.

The software-based load balancers accept connection requests and hand the connections over to the Web server chosen in the balancing scheme. This way, the load balancer only handles the packet once. Thus, for the same processing power, a software load balancer should be able to handle roughly twice the Web service requests of a switch- or router-based device. Resonate's Central Dispatch loads an agent onto the Web server to complete the load balancer connection. IBM's WebSphere requires a loopback adapter on the Web server.

You can configure Radware's Web Server Director as a router, using two interfaces to pass all packets to and from a secure network, or as a server, redirecting connections to the Web servers. If you need to scale beyond its capacity as a router, you can configure Web Server Director like a software load balancer. Similarly, you can configure IPivot's Intelligent Broker 4000 like a router, using its single interface for internal and external connections, and switch to server mode to enhance performance.

As routers, F5's Big/ip and Coyote Point's Equalizer have only two interfaces, one internal and one external. This could limit their throughput when configured as routers, causing performance problems in high-bandwidth situations, such as with a T-3 connection. HydraWeb overcomes this limitation with its four-port Hydra5000 router. HydraWeb also offers an optional global load-balancing management tool called HydraHydra100. The tool provides true enterprise scalability, site-level resiliency, traffic prioritization and disaster recovery.

Locally, the switch-based load balancers scale well. The switches either put Web servers on their own switched ports or cluster the servers on hubs connected to the switch with multiple connections to the WAN interfaces.

HolonTech's HyperFlow 2 is a 16-port load-balancing switch. The other switch we tested, Alteon's ACEdirector 2, has eight ports for servers, and you can add another switch if you need more connections. However, neither switch supports remote Web site load balancing, while the seven other products we tested do.

Management and configuration

Web performance can change by the hour, so you need management tools that let you see how well these devices are doing their jobs and allow you to make configuration changes easily. Web administrators need to know when a server is getting close to full utilization, for example, and they need to be able to easily add another server to the farm.

Configuring Central Dispatch is easy with Resonate's Web-based Java GUI. Because Central Dispatch has agents running on each server, the product allows control of balancing based on server performance. For example, you can shift load based on open connections, CPU speed and CPU utilization.

Radware's Web Server Director's GUI supports NAT and several other load-balancing options. We liked the way Web Server Director allowed us to test response

A HOT MARKET

When we last published a comparative review of load balancers, there were only four vendors able to ship us products (*NW*, Sept. 22, 1997, page 57). This year, 16 vendors submitted products to our interactive Buyer's Guide, and nine out of 11 vendors accepted our invitation to participate in this review. Cisco declined to send us its LocalDirector because the company is working on a new version, scheduled for release in late June; the company chose not to send us a beta version. Foundry Networks also declined our invitation, citing scheduling conflicts.

Not only has the number of vendors grown, but functionality has increased as well. Vendors have introduced Layer 4 switches that can interrogate packet headers to identify selected application traffic. These devices then route the requests to specific servers optimized to respond to that type of traffic. We'll look at these advanced switches and test their load-balancing functions in a comparative review scheduled for publication late this summer — stay tuned.

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time for remote Web site balancing.

ACEdirector 2's Web-based interface is well-designed and intuitive, although it could be a bit more responsive. One of the few drawbacks of ACEdirector is that it doesn't provide server performance history.

The router-based load balancers are the hardest to configure for someone with limited Unix experience. F5's Big/ip doesn't hide its Unix core, though for routine maintenance and configurations, it's not too laborious.

Coyote Point's Equalizer features a Web-based management utility that is fast but plain, giving all the necessary configuration options for load balancing. Equalizer offers innovative data tracking and plotting of historical statistics, which gives you a good idea of how traffic is spiking and when servers are being overloaded.

HolonTech's HyperFlow 2 configuration and management tools were almost as intuitive as Alteon's ACEdirector 2.

Like Big/ip, IBM's WebSphere required Unix knowledge for configuration. Although WebSphere doesn't have a browser-based management interface, it has a simple, polished X Windows GUI for local or remote management that can handle day-to-day configuration tasks for a large Web site.

HydraWeb's Hydra5000 also requires you to configure its load balancer from a Unix command line. Fortunately, HydraWeb's standard policy includes on-site installation with each purchase. HydraWeb is in the final stages of developing a GUI, but it was not available in time for our tests.

IPivot's Intelligent Broker 4000 requires a fair knowledge of Unix commands for configuration and maintenance. A Web-based interface is adequate for day-to-day management and helps you add servers to the cluster.

Keep it safe

A key aspect of managing these devices is making sure they are secure against outside tampering. The dedicated router-based load balancers, which typically run on Unix platforms, offer the best security because they can be set up with access lists, port filtering and other security features. For instance, you can easily configure the devices to allow only hosts from secured addresses to connect. As with all Unix solutions, Coyote Point's Equalizer, HydraWeb's Hydra5000 and F5's Big/ip can be locked down into a secure unit with full NAT capabilities. Among the router-based devices, Big/ip stands out for its extensive packet filtering capabilities.

Another major function of security is the protection of the servers. Hiding Web servers on a private network

How we did it

To evaluate the Web server load balancers, we set up a test network to simulate PC clients requesting Web pages from a Web server. We tested performance using Microsoft's Web Capacity Analysis Tool (WCAT) using its predefined ASP50 test, which retrieves a mixture of Active Server Pages and small files between 1K and 1M byte in a ratio of 50/50. To establish a baseline for comparison, we first used six and then 12 clients, each of which simulated five Web clients, to send requests to one Microsoft Internet Information Server Web server running on a 350 MHz Pentium II with 128M bytes of RAM. We added each load balancer to the test bed, then repeated the WCAT performance tests. Finally, we added a second and then a third Web server to the test network and repeated the WCAT performance tests.

We also evaluated each product on scalability of design, management and configuration tools, security features and ease of installation.

WHAT YOU NEED TO KNOW BEFORE YOU BUY

Different sites drive different load-balancing requirements, but when selecting a load balancer, certain guidelines make sense no matter what.

Performance and scalability

You don't want your load balancer to be a bottleneck for processing incoming requests (measured in connection/sec) or for flowing return traffic back to the clients (measured in M bit/sec). Keeping up with incoming requests generally requires multiple schedulers that hit a common set of content servers. A single scheduler is always at risk of becoming congested, no matter how powerful the underlying CPU. Supporting high throughput requires a scheduler that can efficiently process return traffic or allow it to bypass the scheduler.

When assessing performance, focus on the product's TCP connection binding rates and HTTP redirection rates when all the features and services you need are engaged. These figures are much more relevant in the real world than throughput. For DS-3 levels of WAN bandwidth, we recommend that a server load balancer be able to handle up to 3,000 TCP connection/sec while performing the functions you require.

Redundancy

Server load balancing is all about reliability, so the last thing you want is an undependable scheduler. Make sure any redundancy scheme allows you to:

- Actively use multiple schedulers when all are healthy.
- Physically locate backup schedulers in different locations, such as in separate data centers.
- Maintain existing persistent connections when failover occurs.

Management

Ease of use is your main management priority. Some key features to look for:

- Feedback on site performance, including site availability and application response time.
- Access to data on the underlying resource loads that impact site-level performance. Ideally, you'd like the management system to point you to bottlenecks and prompt you to add new resources, weight servers or modify policies.
- The ability to conceive "what-if" scenarios and simulate a variety of possible loads. Load patterns can change quickly, and trend analysis features don't necessarily predict future loads.
- Integration with your content management system so the load balancer automatically adapts as content is updated.
- Secure management interfaces.

Advanced features

The list of available load-balancing features keeps growing. Our overriding advice is not to get carried away, particularly by unproven techniques.

Feedback on resource health is critical. All server load balancers should provide Active Content Verification and Dynamic Application Verification. These techniques will let you know that your content servers, database servers, e-mail servers and application servers are really doing their jobs.

Delayed binding is another important feature. Delayed binding enables a load balancer to direct traffic based on URLs, cookies, Secure Sockets Layer (SSL) Session ID and other bits of information that are not provided by the client until the TCP connection has been completed. But be aware — delayed binding places a performance load on the scheduler.

For policies, weighted round robin or least connections are usually your best choices, especially if you supplement them with safeguard mechanisms triggered by thresholds, such as number of connections or the servers' CPU utilization or available memory.

Some simple quality-of-service policies make sense for allocating resources to high-priority applications. But only rely on them for dealing with short-term issues. Longer term, try to design your site so resources are not saturated by peak loads, if your budget permits.

Above all, make sure you implement strong, simple persistence policies. Persistence always takes precedence over better load balancing because persistence determines if a user can effectively interact with the application, while load balancing provides only incremental performance improvements.

Unless you require persistency that spans long periods of inactivity, the simplest and most general approach is to bind users by their source IP addresses. Often you'll need to use Address Range Mapping to ensure that users coming from behind proxy firewalls stay connected to the same application server for as long as it takes to complete a session. In some circumstances, adding SSL Session ID Tracking and/or user cookie tracking might make sense — which is one reason why delayed binding at high speeds is often essential.

— Mark Hoover

More
Online

Forms follow function

Architectural and packaging approaches to load balancing vary from vendor to vendor, though we've identified three main categories of Web server load balancers: software products, dedicated hardware devices and switches with built-in load-balancing features. For a detailed look at which vendors have adopted what forms, take a look online. You'll also find a comprehensive discussion of the pros and cons associated with each product type.

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and using NAT forces users to go through the load balancer before attaching to the Web servers. Of course, this can only be done when the load balancer is acting as a router. Only IBM's WebSphere and Resonate's Central Dispatch do not perform this function.

Alteon's ACEdirector 2 has all the standard security features, including NAT. However, as a Web server, ACEdirector 2 might be vulnerable. By default, ACEdirector 2 requires only a user name and password to get into the HTTP configuration utilities and is also open to remote telnet connections.

Not only does HolonTech's HyperFlow 2 provide NAT, but it also has controls to secure the unit from all but authorized protocols and addresses. In this respect, HyperFlow 2 is like the Unix platforms, but it's configured using a browser-based GUI.

Resonate's Central Dispatch and IBM's WebSphere lack the added security that NAT provides. Also, because the software-based balancers require a software agent to be installed on the Web servers and a loopback adapter to be configured, they may make some Web administrators nervous about conflicting software and possible security holes. Both packages rely on the underlying platforms to provide local security.

Radware's Web Server Director and IPivot's Intelligent Broker 4000 can provide tight security for themselves and the cluster of servers they service in router mode, but not when they are acting as servers.

Getting started

Most of the products were easy to install, though the Unix-based packages were generally more complex.

We had some trouble installing HolonTech's HyperFlow 2, mostly because of minor errors in the installation guide. Installing IPivot's Intelligent Broker 4000 was not a simple task. The process required a fair amount of Unix-like configuration. The documentation was adequate, although sometimes confusing.

HydraWeb's standard policy is to send an engineer onsite to install and configure HydraWeb's Hydra5000. Even with the engineer, installation was lengthy and confusing.

More

Online

- Download Microsoft's Web Capacity Analysis Tool.
- Read up on load-balancing service providers.
- Chat with Mark Hoover.
- Get advice from load-balancing veterans.

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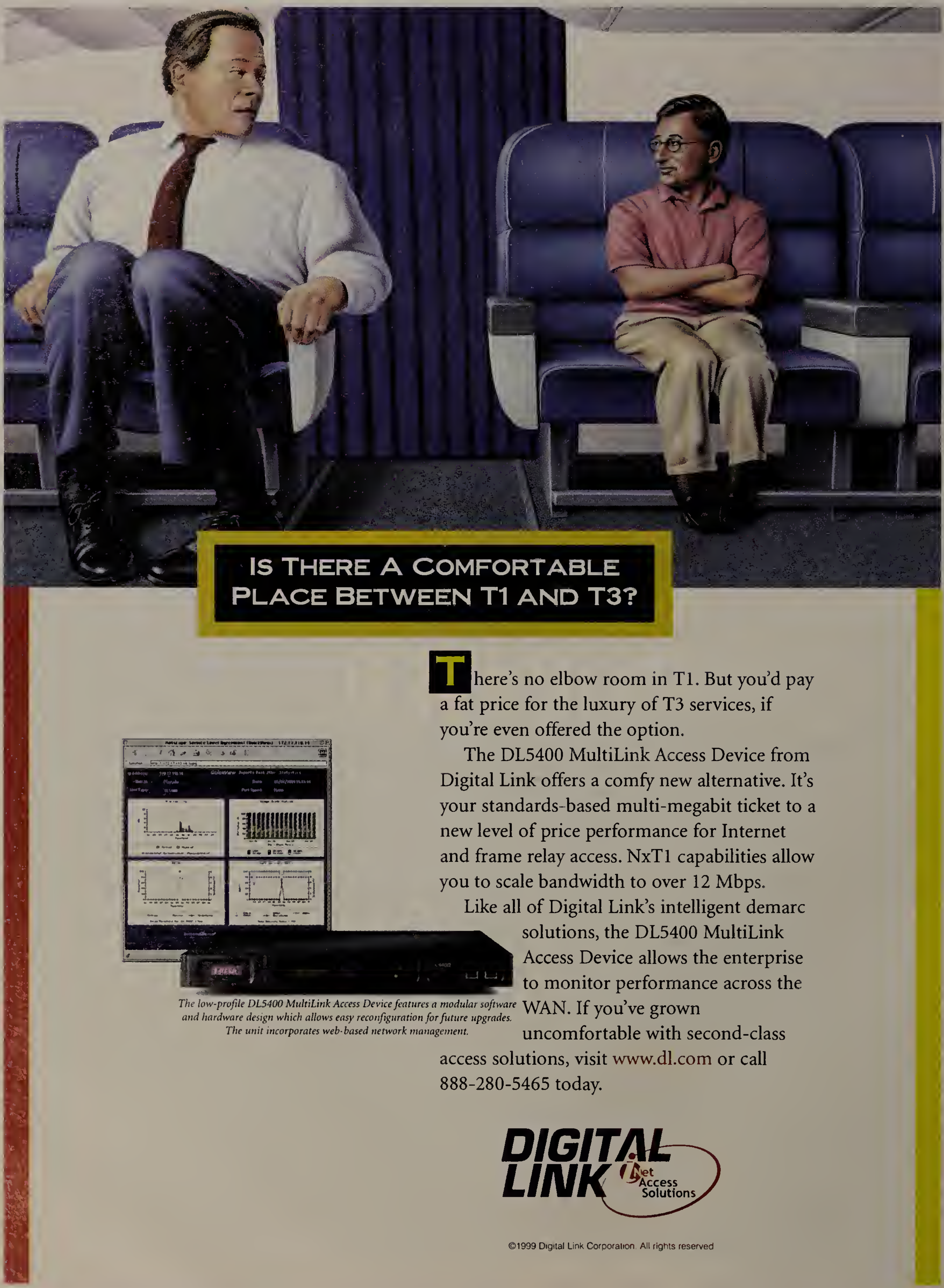
[illegible]

Considering that all the products we tested are relatively new, we were surprised at how well they performed and found something to like about each. In the end, Resonate's Central Dispatch scored the highest on the strength of its performance, management tools and ease of installation. With a little refining, the competition could bridge the narrow gap that separates them from our Blue Ribbon Award winner.

Anderson is the Network Lab manager and James is vice president of Lab Services at LANQuest Labs, an independent test lab specializing in network quality assurance, certification and performance testing services. Anderson and James can be reached at panderson@lanquest.com and gjames@lanquest.com.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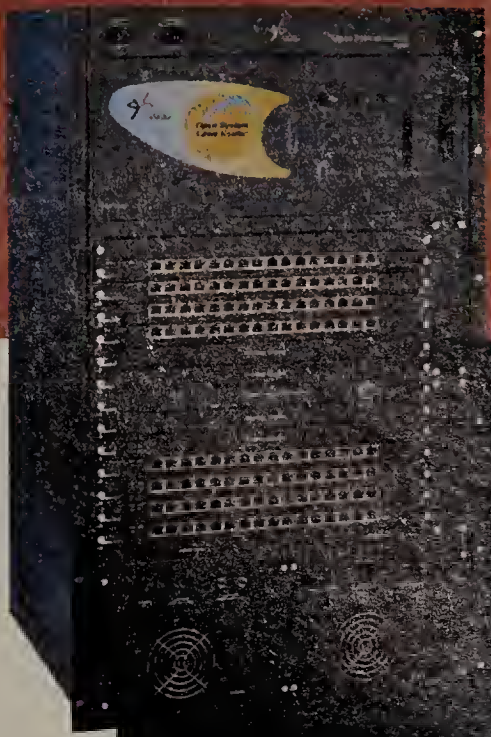

On April 5,1999 NBase-Xyplex introduced the first Open System Switch Router to use the Linux operating system. The Linux Router delivers the horsepower needed to address tomorrow's Internet requirements. Editors, Analysts, and the Linux community have enthusiastically responded.

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ETHERNET ALTERNATIVE

BY BOB BELLMAN

WideBand Gigabit Networking hasn't generated much buzz, but backers of the LAN technology say its quality-of-service (QoS) features and low cost meet a market need that neither ATM, Fibre Channel nor Gigabit Ethernet can satisfy.

WideBand provides 1G bit/sec aggregate throughput with guaranteed QoS over Category 5 copper wiring. It was invented by Roger Billings in the early 1990s, when he was president of the International Academy of Science in Independence, Mo.

High-speed routers were too expensive for many organizations at the time, so Billings developed WideBand technology as an affordable way to boost Ethernet performance. He wanted to provide an inexpensive platform for schools and other low-budget operations to experiment with multicast video.

Billings founded WideBand Corp. in 1994 and the firm began shipping products in 1996. The vendor's WideBand products include network adapters and LAN concentrators, plus FiberLink modules for interconnecting WideBand components over fiber-optic cable. WideBand Corp. also resells a variety of WideBand-enabled servers from WideNet Corp.

Compared with other gigabit technologies, WideBand is priced quite reasonably. A PCI network adapter from WideBand Corp. lists for $199, while a nine-port concentrator costs just $1,665. Contrast this with the 3Com Gigabit EtherLink Server network interface card's list price of $895, and the $6,395 cost of the 3Com SuperStack II Hub 1000 SX.

However, WideBand technology doesn't pose a threat to Gigabit Ethernet because few vendors aside from WideBand Corp. and WideNet manufacture WideBand adapters and concentrators. The brand equity of the Ethernet architecture is overwhelming, and the forthcoming standard for Gigabit Ethernet over copper may eventually eat into WideBand's cost advantage.

Under the covers

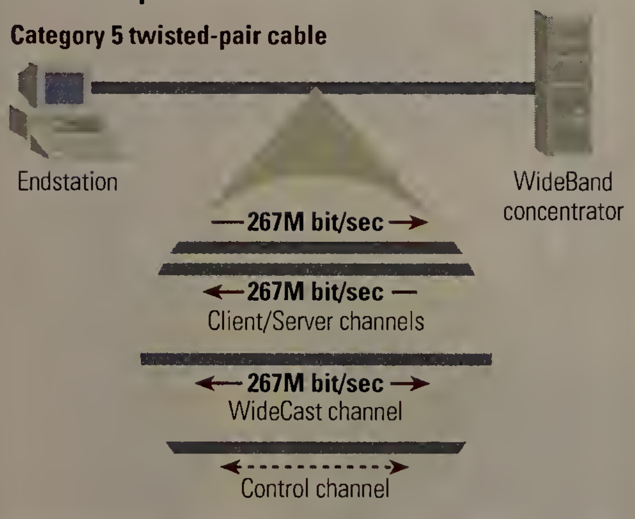
To network operating systems, WideBand looks just like Ethernet, with standard IEEE 802.3 packets and addresses. But when an operating system hands a packet to the WideBand driver for output, the driver adds a special WideBand header. On input, the driver removes the header and returns the packet to Ethernet format. Thus, Ethernet users can reap the benefits of WideBand without changing their software or twisted-pair wiring.

Like Ethernet, WideBand uses a star topology, but that's where the similarity ends. With Ethernet, endstations share the physical medium. As an endstation puts a packet on the wire, it listens for collisions with packets sent by other endstations. If it hears a collision, it backs off and tries again later.

WideBand technology makes gigabit speeds and streaming video affordable for the classroom.

How WideBand works

A WideBand cable includes four wire pairs. Two pairs comprise a 267M bit/sec full-duplex client/server channel. One pair is a WideCast channel for streaming video and other delay-sensitive traffic. The fourth pair is a control channel.



Ethernet collision detection may be effective, but it's not terribly efficient. A 10M bit/sec shared Ethernet LAN delivers only 4M to 5M bit/sec of usable throughput. The remaining bandwidth is spent on collision detection and back-offs.

While switches reduce the size of Ethernet collision domains, WideBand uses bandwidth more efficiently than Ethernet. Packets from different sources travel with very little space between them, and no bandwidth is wasted on false starts.

Each Category 5 cable between endstation and concentrator (essentially a switch) includes four twisted pairs (see graphic). The first pair serves as a 267M bit/sec path from the endstation to the concentrator, while the second pair serves as a 267M bit/sec path in the opposite direction. Together, these pairs provide a full-duplex connection for ordinary client/server traffic. The third pair is a 267M bit/sec WideCast channel for delay-sensitive traffic, and the fourth pair is a control channel. (The actual bit rate of the client/server and WideCast channels is closer to 333M bit/sec, but 20% is lost to encoding overhead.)

Although WideBand doesn't allow for collisions on the wire, packets from two endstations can arrive at the concentrator simultaneously and compete for the input buffer. When this happens, the concentrator signals one of the senders to wait until the other is done. However, the 267M bit/sec makes the wait infinitesimal. With Ethernet, both senders have to back off and wait an arbitrary amount of time before they try again.

WideBand supports traffic prioritization on the client/server channels via a class-of-service identifier in each packet header. The network technology provides QoS by segregating delay-sensitive traffic and sending it over the WideCast channel. The WideCast channel can carry up to 170 MPEG-1 video streams simultaneously, says Paul Cherry, secretary of the WideBand Gigabit Networking Alliance (WGNA) steering committee and director of WideBand training at the International Academy of Science.

Banding together

Formed in 1997 to promote WideBand technology, the WGNA has nearly 50 members. Cable manufacturers and academic institutions dominate the roster.

Cable manufacturers back WideBand because it's the ultimate stress test for Category 5 cable.

And schools have joined the WGNA because they're interested in affordable QoS. Northwest Missouri State University, for example, installed a three-building WideBand network about two years ago. The network supports video-based training and a video kiosk, among other bandwidth-intensive applications.

Jon Rickman, Northwest Missouri State's vice president for IS in Maryville, Mo., is impressed with WideBand's performance.

"It's so fast that you don't need to move anything, just access it across the WideBand net," he says. "It changes how you think about networking."

It is organizations such as Rickman's that WideBand vendors are targeting.

"We're aimed at schools and others who need video support but can't pay the big price," says Cherry. "We're not going head-to-head with the big guys for the business market."

Bellman is president of Brook Trail Research, a consulting firm in Natick, Mass. He can be reached at bob@brooktrail.com.

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- Information about the WideBand Gigabit Networking Alliance.
- WideBand Gigabit Networking product specs from WideBand Corp. and WideNet Corp.

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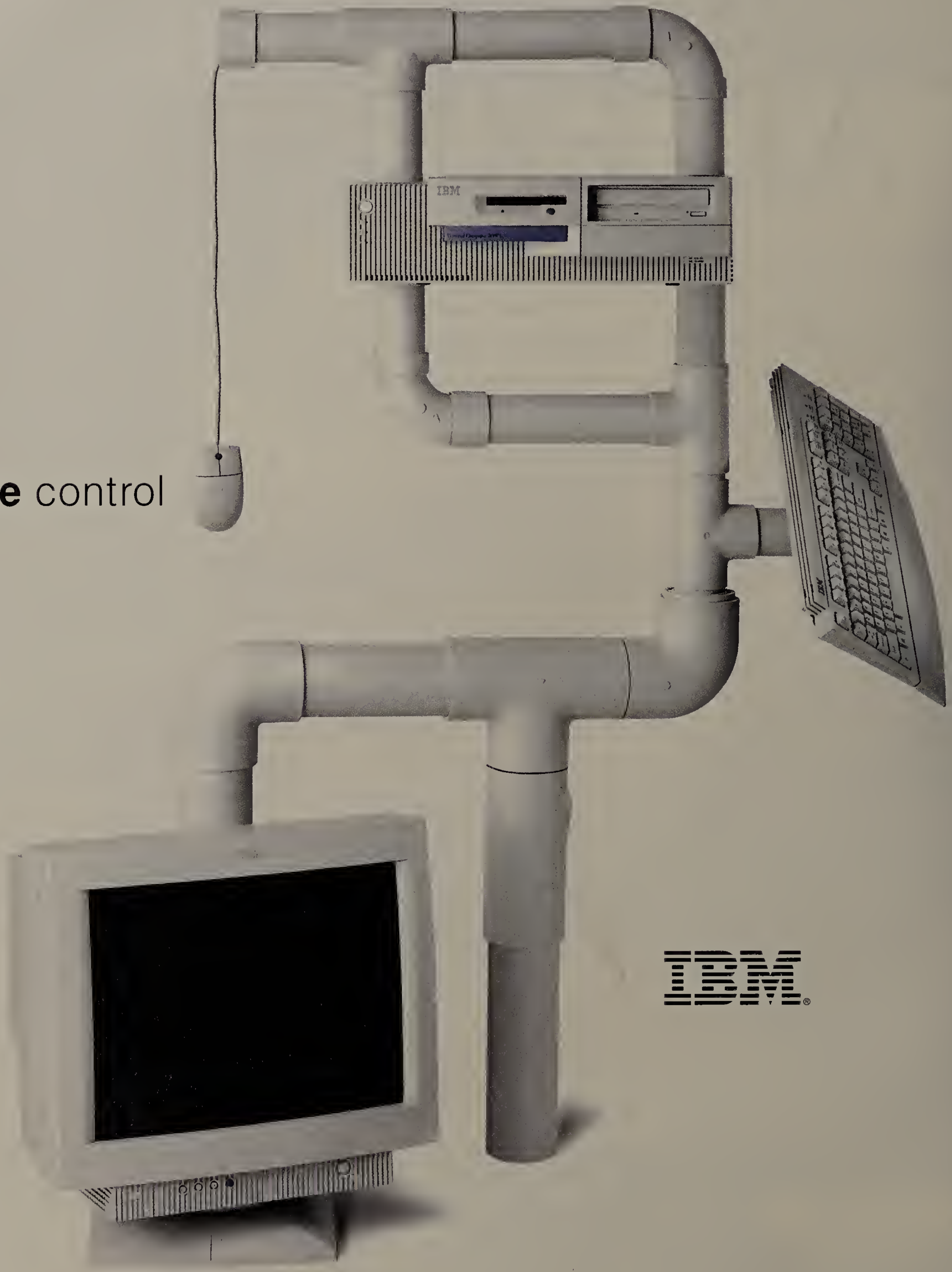

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Rocky Mountain high

Network firms are flocking to the Mile High City, making the area a hot spot for IT jobs.

BY JULIE BORT

"Colorado's got Denver, and it's got scenery," one 1880s traveler wrote. Had his trip been in 1999, he would have noted, "and Denver's got telecommunications."

In the past few years, the metropolitan Denver area has become a nucleus for the communications industry and a hot spot for IT jobs.

US WEST and the former Tele-Communications, Inc. were joined in Denver in 1996 by Qwest Communications, the fastest growing employer on *Network World's* NW200 (*NW*, April 26, page 48). Lucent built its telecom Network Reliability Center here in 1997 and is already one of the area's largest employers. Level 3 Communications established its headquarters here in March 1998, and last September Sun relocated its $1.2 billion Enterprise Services division to the building next door.

Network companies are lining up to establish operations in Colorado. The Front Range area north and south of the city houses offices of Adobe Systems, Hewlett-Packard, IBM, J.D. Edwards, Microsoft, MCI WorldCom, Oracle and a slew of startup businesses. In fact, more than 500 high-tech companies belong to the Colorado Software Association.

The area hosts hundreds of nontechnical enterprises too, such as Boston Chicken, Celestial Seasonings and Coors Brewing Co. Moreover, United Airlines and Lockheed Martin employ thousands here. The region has a strong oil and energy industry, federal laboratories such as the National Institute for Standards and Testing, and a lot of military.

The presence of all the companies adds up to a big talent deficit in all things technical, IT managers say.

"Over the last two-and-a-half years it's been harder to deal with staffing because of the number of technology companies in Denver," says Steve McKowen, director of IT for Celestial Seasonings in Boulder. Still, McKowen says his firm will benefit from the high-tech boom because it will boost the local talent pool.

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- **Find out about upcoming IT job fairs in Colorado.**
- **A list of the members of the Colorado Software Association, the voice of the state's IT businesses.**
- **Information about the Metro Denver Network economic development coalition.**

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If you know a NIC from a NOS, Denver's got a job for you, says Heather Kelsey, spokesperson for the Colorado Technical Recruiters Network (CTRN), a 300-member nonprofit organization. According to a survey of 43 CTRN members conducted for *Network World*, one-third of respondents named WAN and LAN jobs as having grown the most within their organizations. Recruiters say database programming skills are the hardest to find.

"We need everything from software developers to the network side. There are so many unfilled IT positions," Kelsey says.

Local companies that are stumbling over themselves to hire IT professionals are increasing their national searches. For example, CTRN respondents said they hired out-of-area job candidates one-third of the time last year; next year, they plan to relocate almost half of their new hires.

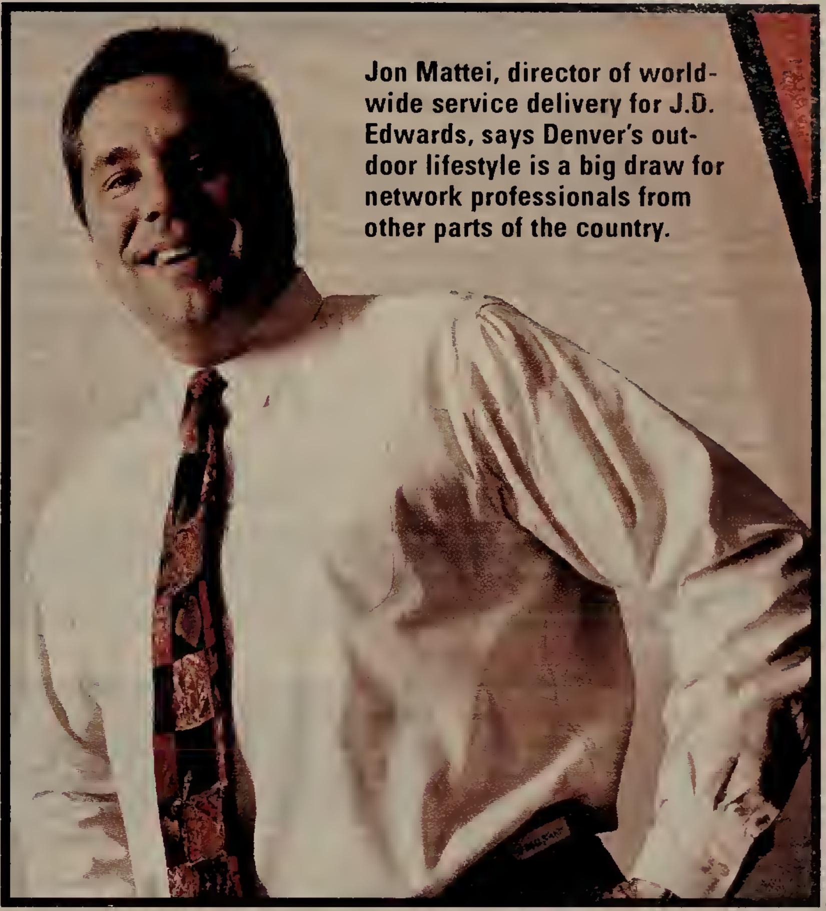
"We have to move very, very quickly in this market. We'll get a resume, get the candidate in a day later and offer a job the next day. It's an employee's market," says Reina Boch, director of human resources for Evolving Systems, a telecom software vendor in Englewood.

Quality of life is by far the Denver area's biggest draw. Before Level 3 chose Denver, it hired the Arthur Andersen consulting firm to study the best location for its headquarters.

"We interviewed 650 college students and others in telecom," says Audry LeMar, senior director of HR for the company. Respondents wanted access to outdoor recreation, a city with a sense of community and good technical universities where they could continue their education. "Denver came out on top," she says.

The Colorado capital has an average of 275 days of sun, nearby mountains, several universities, a performing arts complex, a symphony and other cultural niceties.

Jon Mattei, director of worldwide service delivery for J.D. Edwards, moved to Denver in 1989 from Boston. "The quality-of-life issue is a big plus," he says. "I like the outdoors, the climate, the pace of life."


Jon Mattei, director of worldwide service delivery for J.D. Edwards, says Denver's outdoor lifestyle is a big draw for network professionals from other parts of the country.

DIANE HUNTRESS

Not surprisingly, Mattei says his employees feel the same way. One-third of the company's IT staff is located in Denver. "In the past few months, I've relocated eight employees who wanted to come here for the outdoor lifestyle," he says.

Still, Denver's not nirvana. The technology boom has driven up housing costs. Salaries haven't quite kept pace, and employers resist relocation perks, says Randall Balthrop, technical recruiting consultant with Workforce Innovations in Denver.

The average three-bedroom house costs $221,000 in Denver County, up from an average cost of $178,000 in 1997. The ACCRA cost-of-living index pegged Denver at 109 last quarter, making the city a bit more expensive than the national average of 100. Still, Denver is less expensive than East San Francisco Bay, which scored 163, and Manhattan, which scored 225.

Balthrop says salaries are commensurate with other cities in the West and mid-West but are behind other technology hubs such as Boston or Silicon Valley. Network engineers make about $45,000 to $65,000. Network executives can earn $100,000 or more, though the highest paying jobs are in the service provider industry, not the enterprise.

However, companies are moving quickly to catch up.

"I see companies more willing to negotiate relocation packages. Salaries are improving. In the last two years, I've seen the numbers increase a good 15% to 25%," Balthrop says. ◪

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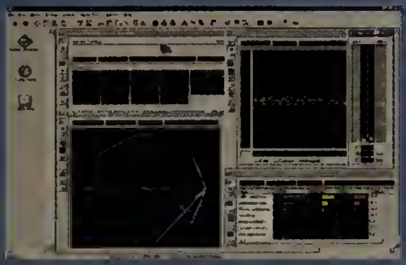

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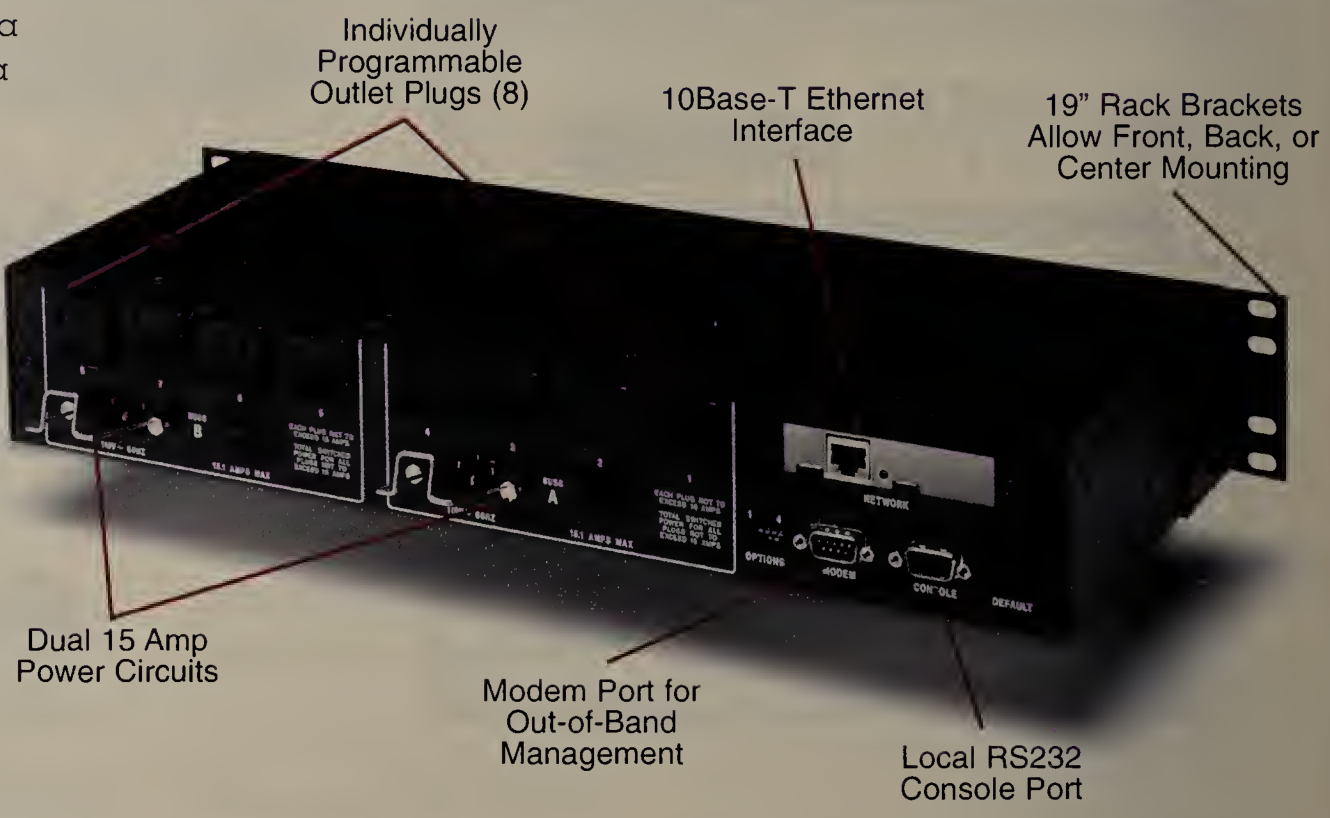
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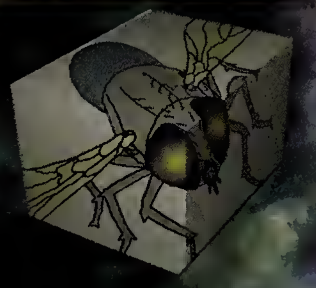

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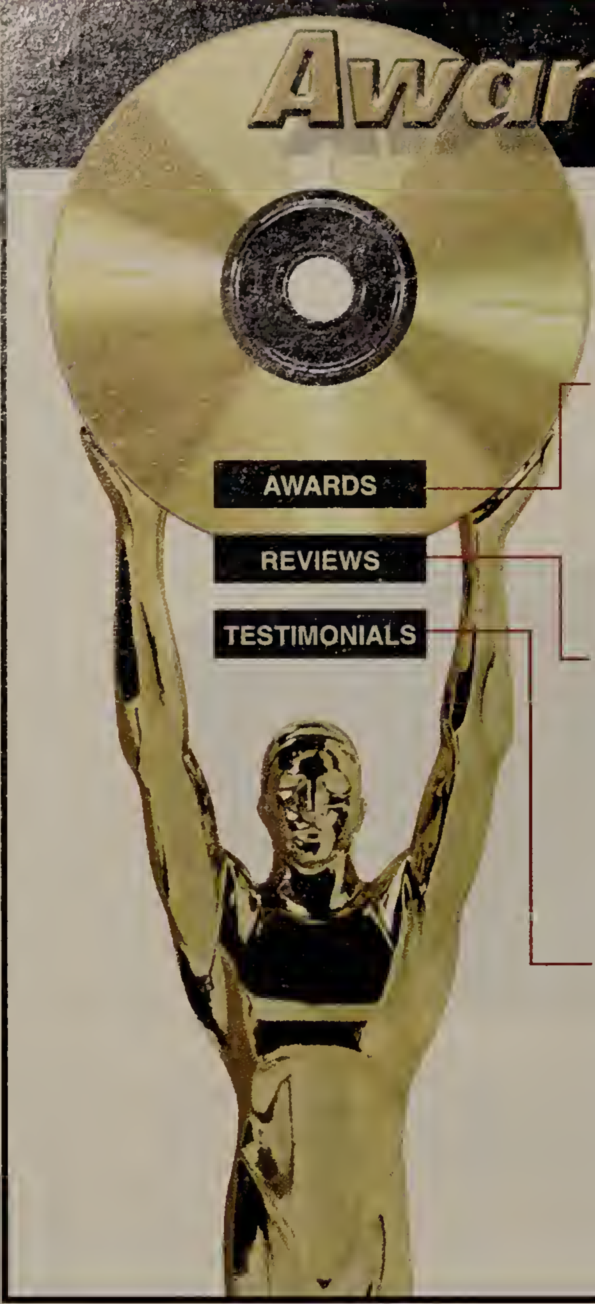

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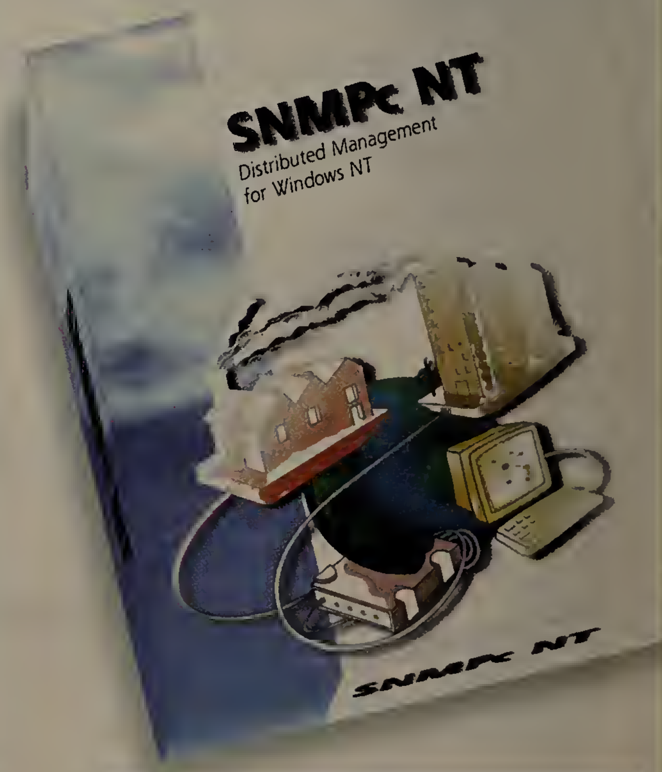

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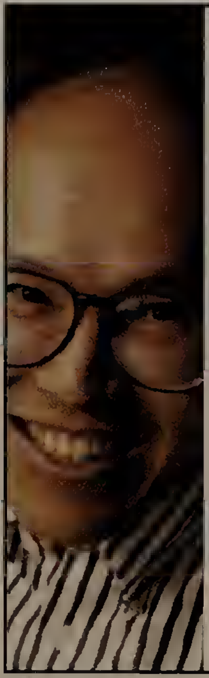

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Internet: clasker@nww.com
Debbie Lovell, Senior Sales Associate
(508) 875-6400/FAX:(508)879-5760

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Internet: abartuli@nww.com
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(949) 250-3006/FAX: (949) 833-2857

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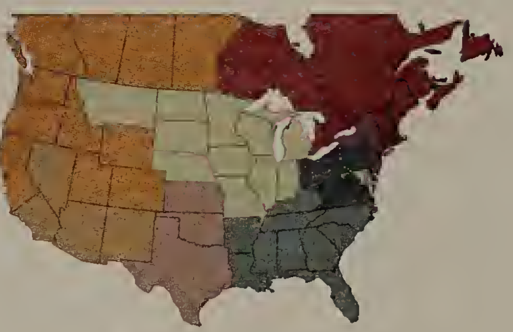

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The

Scoop

The news behind the news

WHY CAN'T RBOCS GET INTO LONG-DISTANCE?

Ever since the wave of telecom mergers began, people have asked whether an established long-distance carrier and a regional Bell operating company would make an ideal match. The long-distance carrier would get local loops with ubiquitous coverage, and the RBOC would get into long-distance.

Well, such a merger could happen, but it wouldn't bring any of those benefits — at least not right now.

RBOCs are hobbled by Section 271 of the Telecommunications Act of 1996. Under that section, RBOCs are barred from the long-distance market until they meet a 14-point local-competition checklist demonstrating that new local carriers in their areas can interconnect and compete freely. The RBOCs must file Section 271 applications one state at a time.

For example, in the nine-state BellSouth region, BellSouth must win Section 271 cases at the Federal Communications Commission nine times to get complete long-distance authority. Or to take another example, Bell Atlantic could first win long-distance authority in New York and Massachusetts, but not receive authority in the rest of its region until later. Indeed, that's the scenario many analysts expect to play out in the Northeast over the next year.

But so far, no RBOC has yet won a Section 271 case anywhere. What's more, an RBOC can't shake its legal roots via a merger. Section 271 carefully applies its rules to RBOCs and their "affiliates." And in 15 years of RBOC court battles since the original AT&T divestiture in 1984, federal judges have consistently applied their rulings to the Bell companies and their "successors." Plus, the current FCC will brook no loopholes. Last year, Qwest made a deal with US WEST and Ameritech under which the RBOCs would merely act as marketing agents — say through direct mail — for Qwest consumer long-distance, with no attempt at bundling. The RBOCs even began selling the service until a federal court ordered a stay. The FCC then ordered Qwest and the RBOCs to cut it out.

None of this means that a Bell and a long-distance company can't merge their corporations if they pass a U.S. Department of Justice antitrust test. But legal experts agree that in such a merger, the local and long-distance arms would be barred from bundling the two types of services within the RBOC's territory until they pass the Section 271 test. Some go further, maintaining that the merged company would have to take a step backward and stop selling long-distance altogether in the RBOC region until the merged company secures Section 271 approvals.

So why are these companies talking to one another? It's simple: Telecom CEOs all know that it will take 18 months to get regulatory approval for any merger involving an RBOC. During those 18 months, the Bell side of the merger could work on its Section 271 applications, keeping a close eye on AT&T and its new residential telephony and Internet business over cable lines. If AT&T makes progress, the two merger partners could guarantee the FCC true regionwide local competition in exchange for simultaneous merger and Section 271 approvals. If AT&T stumbles, the partners could always call the merger off. Even when he's not part of the deal, AT&T CEO C. Michael Armstrong is still the key man affecting almost everything in the carrier business today.

— David Rohde

Qwest,
continued from page 1

marriage as a follow-up to BellSouth's recent 10% investment in the long-distance carrier (*NW,* April 20, page 31).

The same filing reveals that Qwest is limiting BellSouth's leverage as even a minority stockholder until BellSouth rids itself of a key regulatory restriction. Under the 10% stock deal, the filing says, BellSouth is not entitled to any Qwest board seats until it has won long-distance authority from state and federal regulators in five of the nine states in its region, including Florida or Georgia.

BellSouth currently may not sell long-distance in its states, either on its own or with a long-distance merger partner. In fact, nearly 3 1/2 years after enactment of the Telecommunications Act of 1996, no RBOC has won long-distance authority anywhere (see story, left). By contrast, GTE and some other non-Bell local exchange carriers can and do offer long-distance voice and data services.

According to one analyst, the board restriction is a bargaining chip by Qwest CEO Joe Nacchio. Qwest wants BellSouth — or any other potential RBOC merger partner — to go much faster in obtaining long-distance authority from the FCC, says Robert Rosenberg, president of Insight Research, a consulting firm in Parsippany, N.J.

Nacchio has chosen BellSouth as his partner because "he wants access to a customer base in high-growth areas," Rosenberg says. But Nacchio could just as easily switch to Bell Atlantic or another RBOC if either seems more likely to get a majority of its states approved for long-distance first.

The same logic applies to other recent RBOC investments in long-distance carriers, says Eileen Eastman, director of telecommunications research and consulting at The Yankee Group in Boston. "SBC owns 10% of [new long-distance carrier] Williams," Eastman notes. "Is it likely that somebody will eventually, some day, buy Williams? Yes. Is it imminent? I don't think so."

But there's a big factor setting up all the new discussions: AT&T's move into residential local telephony and broadband Internet access via its newly acquired cable lines.

"A&T buying Tele-Communications, Inc. has kind of put the fear of God into the RBOCs," Eastman says. "They thought that the consumer market was pretty safe. Now they're going to have a contender on their doorstep."

"They're highly resentful of the fact that AT&T is doing whatever it damn well pleases," adds Alan Pearce, president of Information Age Economics, a Washington, D.C., consulting firm. "They're determined to unleash themselves." BellSouth and Qwest could announce a merger knowing that it would take a long time to receive antitrust approval, and "in that time they could get at least five of their nine states approved for long-distance," Pearce says.

A BellSouth spokesman says a prompt BellSouth/Qwest merger could provide value because the two could legally sell bundled services together outside the BellSouth region. But he concedes that without FCC long-distance approval for BellSouth, the two could be prohibited from marketing together in the BellSouth region and Qwest could be temporarily banned from selling long-distance in the Southeast until BellSouth wins the long-distance nod. The telecom act says Bell long-distance rules apply to RBOCs and their affiliates.

BellSouth's long-distance approval effort is going "full-bore" despite past FCC rejections, the spokesman says. And reaching a majority of states might not be as lengthy a process as it seems, he adds: "There's a general belief that once one state gets [long-distance approval], that sets a template for the rest of the states in that region."

A Qwest spokeswoman declined comment. ◪

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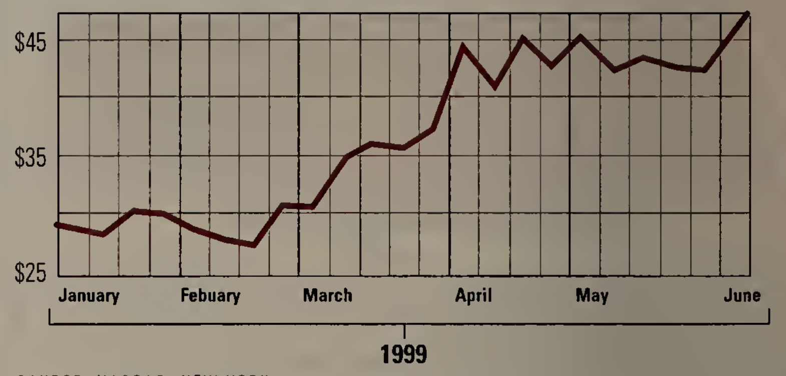
Coveting success

Qwest's positive stock performance this year has attracted BellSouth as a potential merger partner.



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LMDS,
continued from page 14

gent supports voice and data services in the 24-GHz band using a proprietary digital microwave technology. WinStar Communications also offers digital microwave services in the 38-GHz band and has LMDS licenses, but it hasn't started building out its LMDS network.

MMDS has also been around for several years, but the focus of this technology has changed recently. MMDS operates in the 2.4- to 2.7-GHz band and was originally designed as a one-way wireless cable TV technology. Because that idea didn't take off, the FCC recently approved MMDS for two-way communications in a handful of states, opening the door to data and Internet access services.

One of the main differences between MMDS and its counterparts is that MMDS is not as fast. MMDS supports transmission rates of about 128K bit/sec up to 3M bit/sec. This makes it well-suited for residential and small-office services, Egan says.

With MMDS looking more promising, Sprint and MCI WorldCom have recently made million-dollar acquisitions to take advantage of this existing wireless infrastructure. Sprint acquired Transworld Telecommunications and three other firms earlier this year for a total of more than $800 million. MCI WorldCom acquired CAI Wireless for about $400 million. ◪

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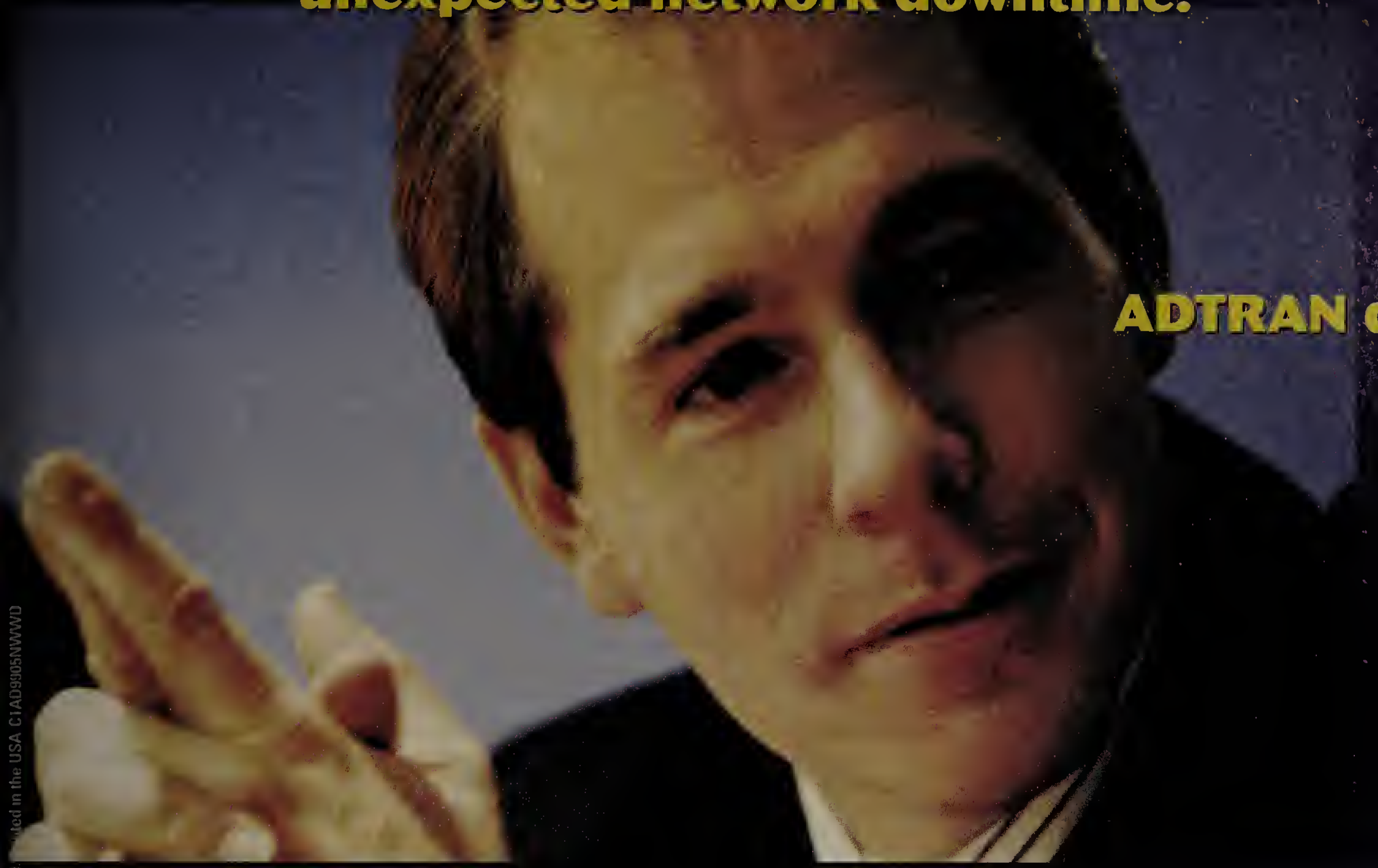

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VPN,
continued from page 1

of what the future holds for these young companies. "America has always looked to start-ups. This is why we have Microsoft, this is why we have Cisco," he said.

Fueling the VPN bosses' optimism is their potential to take over significant chunks of the vast remote access and WAN markets.

"It's not a zero-sum game," RedCreek's Steding said. "This market is bigger than the market it's replacing. It's huge."

Already, customers are writing their wish lists for VPN features, Network Alchemy's Frerichs, a Cisco veteran, said. "We've talked to major corporations about what they're looking at — clustered directory services, clustered Web services, database services, clustered routing protocols," he said. "When you say VPN, most companies think, 'Oh, it's a replacement for remote access server dial-up.' It's much more complicated and sophisticated than that whole environment."

But even if the VPN vendors just horn in on remote access, they stand to reap enormous rewards, Indus River's Suneby said.

"You have about 25 to 30 million corporate remote access users in the world. At the rate the remote access market is growing, you'll easily have 100 million by 2002," Suneby said. "If they were all VPN remote access users, and you collected $10 a year from each of them for maintenance, that's $1 billion. If they spend $100 to equip themselves initially, that's $10 billion. And that's just remote access for corporate users."

VPNs gain strength from the fact that they can be phased in gradually without requiring companies to rip out existing gear, TimeStep's Hember said.

"I'm a firm believer that the Internet will be the business net that will connect the global one million companies," he said. "The beauty of virtual private networking is that it's complementary to existing means of networking, so you can deploy this stuff nonintrusively."

But Indus River's Suneby said he is seeing companies launch sweeping VPNs that replace and expand their existing WANs.

"We see situations where people increase the number of remote users by a factor of 10 because they now can do it in an easy-to-use solution, and it's cost effective," he said. "We see companies saying, 'I'm eliminating all my nonheadquarters bricks and mortar, and I'm virtualizing the whole company because I can use the Internet to keep everybody connected and working.' To me that's disruptive. That's a big change."

"I don't see corporations doing that," Hember countered.

"Listen, I've got customers doing that," Suneby shot back.

For all their optimism and enthusiasm, the executives said they recognize that right now, their companies are battling to merely survive.

VPN visionaries Kenny Frerichs, Per Suneby, Tim Hember and Tom Steding (left to right) at Drais in Las Vegas, where they discussed their roles in the future of virtual private networks.

DAVID WAITE

Looking around the table at seared tuna, steaks and grilled Chilean sea bass, RedCreek's Steding posed the question: "So speaking personally, are we digestible protein?"

"There's no way 60 VPN suppliers today can survive. Some of them will basically fade away," Frerichs said.

"There will be fewer of us a year from now," Suneby said.

"It's an endurance contest," Steding agreed.

Short term, the Year 2000 problem will hurt VPN vendors' revenues, Frerichs said. He predicted a "cold winter" in which customers just won't buy because they are waiting to see what damage the Y2K problem will do to their networks. They will hold off equipment buys until spring, he predicted.

In addition, these start-ups have to view each other warily. "You've got 18 months from the time you think about what you want to do, to the market penetration, to the actual product, to getting out there and getting customers," Frerichs said. "If you don't get that done in 18 months, you're not going to make it. There are too many well-funded, bright people out there."

Long term, the vendors face the continuing menace of the network giants, particularly Cisco, which holds such powerful sway over many enterprises. Even if VPN vendors have better products, Cisco has clout to keep its customers from buying from others.

"Cisco puts its arms around the customers and says, 'Hey, these guys at Indus River have a great offering, but I'm worried about their ability to support you and take care of you like we have. And we'll have something like they will, eventually,'" Network Alchemy's Frerichs said.

"Arrogant companies try to manage customer relationships to the exclusion of other people. This is not a new story," Suneby said.

Equally worrisome is the fact that Cisco and others just have the sheer size to dominate even if they make mistakes and are slow with products. The VPN start-ups need to bulk up to critical mass, Steding said.

In his view, similar VPN companies would benefit from merging to make themselves more attractive to Wall Street, selling public stock and using the proceeds to develop better products.

"That's a formula that works," Steding said. "Somebody's going to take a bold stroke and reinvent the whole mess, and it's going to change all the rules. The first VPN company out [with a public stock offering] on whatever basis is going to have momentum that's going to be hard to stop."

Hember agreed there was room to beat out Cisco in the VPN market, and noted that not long ago Ascend managed to slingshot past better established vendors in remote access.

"Ascend emerged in the remote access marketplace because it had a very different technology," Hember said.

But he doubted the value of mergers among VPN start-ups unless they bring together technologies that each other lack. "Doubling the size of two architectures that are very similar won't do it. It has to be something that is complementary," TimeStep's Hember said.

"You and I might be a very interesting combination because we're very different," Suneby suggested.

"We could unite against the big guys," Frerichs said.

"We could spend the rest of the night writing [a memorandum of understanding] and merge these four companies. That might be worth doing," Steding joked.

The four marveled at the sums new companies attract from venture capitalists and Wall Street.

"Change your name to RedCreek.com and they'll take you out with a $6 billion market cap. You just have to make sure you lose lots of money if you want to play that game," Frerichs said.

"Yeah, if you actually made money and then went public, it would be a disaster," Steding said.

For all their banter, the executives are taking dead aim at the perceived enemy.

"It's going to be the OK Corral pretty soon," Suneby said. "Remember, in 1990, Cisco was less than $90 million in revenue. Companies that are now dead had product lines in excess of $90 million in revenue in 1990."

As the evening wound down, Steding marked it as a possible historic moment: "This dinner is the beginning of the new age in networking. We go out the door here and take on the world." ◪

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Backspin

More on the science of appliances

"For a list of all the ways technology has failed to improve the quality of life, press 3."

— Apocryphal telephone system announcement

Before last week, when I was lamenting Amazon.com's intransigence, I was waxing lyrical about the appliance of science to household devices, such as refrigerators (*NW,* May 31, page 66).

<digression>The train of thought actually started in "Give me a net-enabled dog groomer," wherein one of my central concerns was dealing with dust bunnies created by my shedding dogs (*NW,* May 24, page 70). You will be glad to know that our friends Jeanne and Becky came up with an answer: We should spray the dust bunnies with beef extract. The dogs will then seek them out and eat them — an interesting and delightfully recursive solution. We will report back when we try it.</digression>

MARK GIBBS

In the column, before I got distracted, I concluded by asking what the implications would be of refrigerators and other appliances interacting with you and the vendors and resellers who supplied them.

Well, a number of you wrote expressing concern that such a thing might happen. It seems your main concerns revolve around reliability, security and privacy.

Let's tackle the first point: Had I asked you 10 years ago how you'd feel about a computer controlling your car's engine, I bet you would have expressed horror at the idea. Most likely, you would have said the possibility of the computer crashing in the middle of traffic would make it an unlikely future scenario. You would, of course, have been wrong. Now the same principle applies to refrigerators, toasters and other appliances.

So let us accept the idea that a power failure is more likely to defrost the chicken than your smart fridge GPFing. Further, critical devices such as fridges will probably have a built-in monitor that will warn you even if the rest of the system has bitten the dust. Next problem?

What about security? A couple of you suggested something along the lines of the neighbor's kid hacking your toaster. Please! Do you really think appliance vendors will be able to sell smart appliances that can be hijacked by the kid next door? In this future, such a potential would be a marketing disaster.

<anotherdigression>Let me just point out here that when you start to think negatively about these issues, put yourself in the shoes of the future consumers — the Generation Y- and Z-ers — using this gear. They will have grown up with this stuff just as you grew up with aircraft while your great-grandparents didn't. Your great-grandparents probably weren't too keen on air journeys, while you are quite comfortable with the idea . . . well, perhaps you accept air travel as a necessary evil, but you get my point.</anotherdigression>

Now as for privacy, we are all getting more familiar with online privacy issues, and vendors will extend our protections because of legal requirements and consumer market demands.

Also, as vendors get more and more data about more and more people, they'll find it increasingly hard to extract value from data on individuals, and so they won't. Hell, most companies today can't even leverage the detailed data they get from existing customers (drop a note to story2@gibbs.com and I'll send you an example), so I doubt they'll do much better in the future.

The reason to make smart, high-tech appliances that communicate will be to make them more valuable to the consumer. I believe that the application of science to your household devices will happen sooner than you think.

How likely is it that I'll be proved right? Let me quote Yogi Berra: "It's tough to make predictions, especially about the future."

Your guess to nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet/intranet industry

PAUL MCNAMARA

We've come across another one of those surveys that purports to show how modern communications devices — e-mail, voice mail, fax — actually get in the way of doing work. This one comes from Pitney Bowes, Gallup and the nonprofit researchers at the Institute for the Future.

Among the findings were that U.S. workers receive an average of 200 e-mails per day and are interrupted by messages of one sort or another every . . . pardon me while I grab the phone . . . every 10 minutes.

Two points: First, that 200 figure is a crock. Granted, there are power users who get that many and more, but a lot of people talk about their e-mail burdens the same way 9-to-5ers whine about 10-hour workdays or Wilt Chamberlain boasts of the 20,000 notches in his bed post. (Do the math on that sometime.)

"A more meaningful metric" would be "meaningful e-mail," suggests the always insightful **John Gallant,** *Network World's* editorial director. Back out all the subscription newsletters, newsgroup chatter and assorted junk, and Gallant guesses that maybe 10 of his 150 daily e-mails fall into that "meaningful" category.

Even if I wasn't such a suck-up, that would still sound about right.

Second point: If these means of communication are such a bother, why wouldn't someone simply go without? When is the last time you heard of someone doing that?

IntraActive's Bantu.com might be just another new Web site at which groups of people can congregate for business or pleasure, if not for the fact that Bantu offers users a choice of interfaces in English, Spanish, French, German, Portuguese and Italian. (By the way, Buzz is reasonably fluent in all but the last five.)

Because almost all geek-speak originates in English and the phrases are generally understood worldwide, designers of the foreign-language Bantu interfaces often face a dilemma, according to **Justin Fidler,** chief technology officer at IntraActive. Should they stick to the intended audience's native tongue or presume words such as "e-mail" belong to a universal language?

"For instance, in Italian, many people know and use the word 'password' for password, but there's also a related Italian word: 'parola chiave,' " Fidler says. "Same goes for French. Most know and expect the English word 'log out,' but there is also a French word 'sortir,' or exit."

These are judgment calls that are generally left to the discretion of Bantu's translators, he adds.

Buzz bows to no one when it comes to respect for **Dr. C. Everett Koop,** whose unshakable candor as surgeon general brought a dose of reality to an otherwise delusional Reagan administration.

Even so, you won't catch this 40-something surfing to the good doc's commercial Web site — drkoop.com — for free medical advice next time some body part starts flashing an error message. I prefer to get my grim diagnoses face-to-face from an appropriately expensive physician, not some searchable database or online support group.

However, it once again appears as though Buzz marches out of step with Internet stock investors. As you may have noticed, drkoop.com went public last week. And, while not exactly a barn burner by recent IPO standards, the first-day results were nothing to sneeze at: up 83% to $16.44 from an offer price of $9.

Drkoop.com's Securities and Exchange Commission filing makes no bones about the fact that the company's foundation is built upon little more than the impeccable reputation of its bearded namesake. That may be a valuable asset, all right, but Dr. Koop was born in Brooklyn, N.Y., on Oct. 14, 1916, making the man 82 years old.

What happens to drkoop.com if drkoop.croaks?

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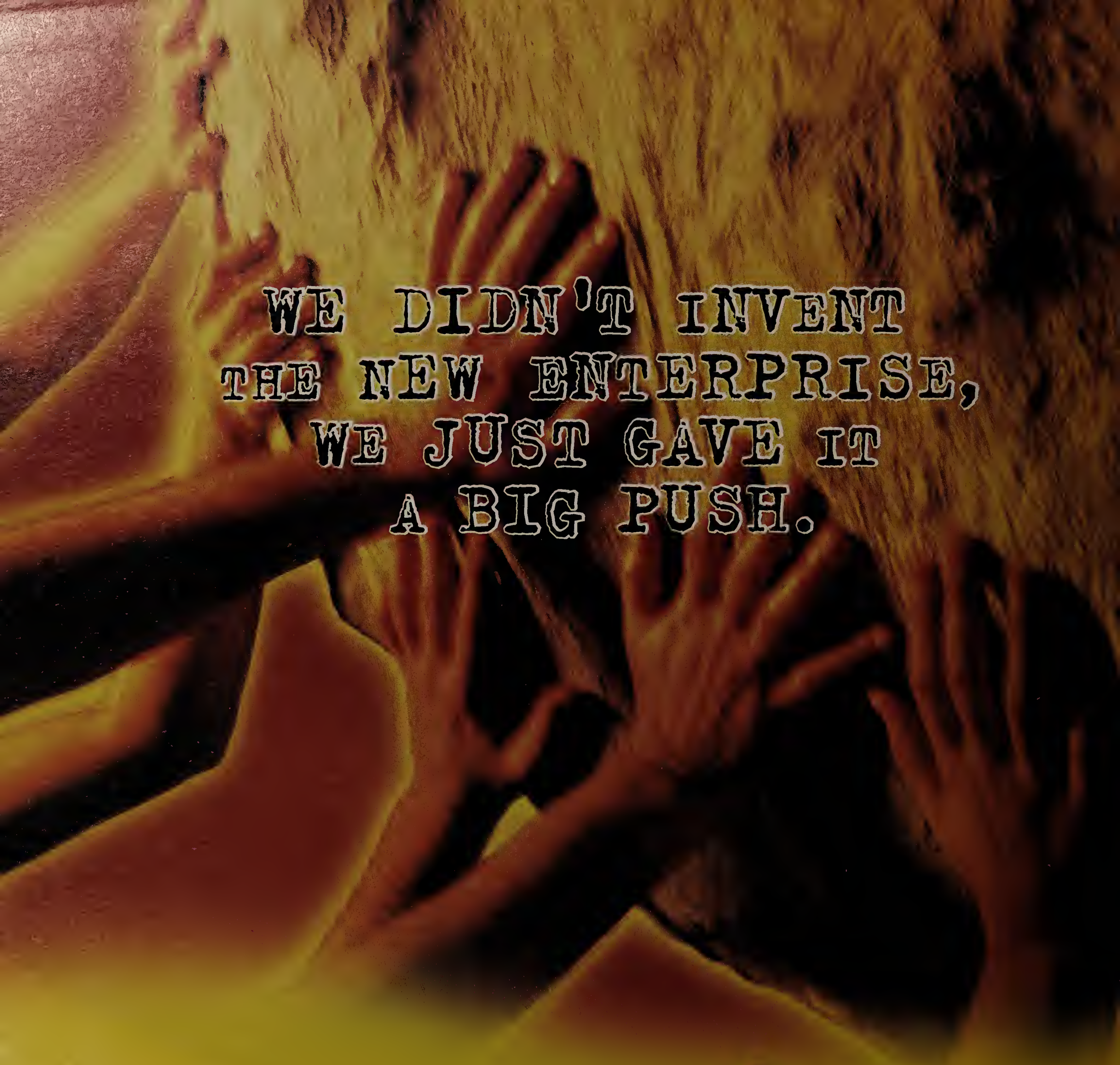

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